REVIEW OF *CRATAEGUS* SERIES *PULCHERRIMAE* (ROSACEAE)

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ABSTRACT

Crataegus series *Pulcherrimae* (Rosaceae) is reviewed, Beadle's group *Sargentianae* being incorporated. Ten species, *C. sargentii*, *C. gilva*, *C. mendosa*, *C. pulcherrima*, *C. pinetorum*, *C. venusta*, *C. opima*, *C. tecta*, *C. pallens*, and *C. eximia* are recognized. In addition, a possible eleventh species, *C. ?robur*, is suggested but the evidence is not yet final on this. All species are lectotypified here except *C. pinetorum*, which is neotypified. Epitypes are proposed for two species, *C. opima* and *C. venusta*. Synonyms are also typified. Each species is keyed out and is represented by the most detailed description to date. Detailed line illustrations and county level range maps, in both cases generally the first for each species, are provided. Repesentative specimens are cited.

Key Words: *Crataegus*, series *Pulcherrimae*, group *Sargentianae*, typification

RESUMEN

Se revisa *Crataegus* serie *Pulcherrimae* (Rosaceae), se incorpora el grupo *Sargentianae* de Beadle. Se reconocen diez especies, *C. sargentii*, *C. gilva*, *C. mendosa*, *C. pulcherrima*, *C. pinetorum*, *C. venusta*, *C. opima*, *C. tecta*, *C. pallens*, y *C. eximia*. Además, se sugiere una posible undécima especie, *C. ?robur*, pero no hay pruebas finales aún. Se lectotipifican todas las especies excepto *C. pinetorum*, que es neotipificada. Se proponen epitipos para dos especies, *C. opima* y *C. venusta*. También se tipifican los sinónimos. Se aporta una clave para todas las especies y se ofrece la descripción más detallada hasta la fecha. Se realizan ilustraciones detalladas y se aportan mapas de distribución a nivel de condado, de ambos generalmente es el primero para cada especie. Se citan especimenes representativos.

The group *Pulcherrimae*, without formal rank or description, was first used by Beadle (1902) in the preparatory paper for his treatment in Small's (1903) Flora of the southeastern United States, edition 2. In the two publications Beadle's treatments are identical and it is notable that all but the Type species, *C. pulcherrima*, were described by Beadle. Beadle's *Pulcherrimae*, which he treated as a group of nine species, was noticed by Sargent (1905) and was used in Palmer's (1925) nomenclator but it was not formally recognized until Robertson (1974) carefully validated the name. Beadle (1902) also recognized another group, *Sargentianae*, of 15 species, all described by him, that in my opinion cannot meaningfully be distinguished from *Pulcherrimae* and it is therefore here included with the latter group such that it now has 24 described species.

Later, Tidestrom, in Small's Manual of the Southeastern Flora (1933), dispensed with all the species of *Pulcherrimae* and *Sargentianae*, and henceforth floras of the region usually followed this example. A few, however, like Kurz and Godfrey (1962) did recognize the existence of the series and thus, a handful of its species continued to appear sporadically.

This paper, based on the examination of 374 herbarium sheets from 25 herbaria and numerous field trips to the relevant region, reviews series *Pulcherrimae* as a whole for

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the first time since Beadle inaugurated the groups *Pulcherrimae* and *Sargentianae* in 1902. Like other members of this series of papers, this one is a precursor to the author's treatment in Flora of North America, vol. 9, due to be published next year. As such, it is not intended to make a deep analysis of serial boundaries or relationships but rather has the principal aim of assessing the individual species to be recognized. Nevertheless, a few obviously necessary adjustments to serial boundaries are provided in papers for this series. Accordingly, I am characterizing series *Pulcherrimae* as being almost completely glabrous at maturity, having possession of 20 stamens, red or yellow fruit and a somewhat elevated fruiting calyx. Though this diagnosis now includes Beadle's group *Sargentianae* the expanded series does not appear to meaningfully widen the original diagnosis for ser. *Pulcherrimae*. The relationships of ser. *Pulcherrimae* are clearly to ser. *Intricatae*. Indeed, ser. *Intricatae*, a mainly 10-stamen group with a number of very hairy species, is not in other respects very different from ser. *Pulcherrimae* and the two may eventually be fused, a procedure which is, however, not appropriate to this paper. Series *Pulcherrimae*, whether considered in its narrow sense or in the extended sense (including *Sargentianae*), is restricted to the southeastern United States except for some overflow into southeastern Texas.

The approach used for this work, after the series boundaries had been settled on, was to study the maximum number of specimens possible over an approximate 15-year time frame. Accordingly, loans were requested from over 40 herbaria in the southeast plus several national herbaria with significant *Crataegus* collections. Only 24 institutions, however, were able to produce specimens of this series. Therefore the first author, assisted often by O'Kennon, made numerous field trips to the region to search for further specimens of ser. *Pulcherrimae* as well as other *Crataegus* species. The results of this fieldwork proved very helpful and review of the appendix of cited specimens shows that UWO now has more *Pulcherrimae* exemplars than the totality of specimens received on loan from all other herbaria. The specimens received on loan plus the UWO collections were then grouped into the more distinctive and repeatedly encountered morphotypes with few if any intermediates between them. These were then described in detail, where possible, by matching with type material, which is well represented for this series. The names used were typified, a key to taxa recognized made and then line illustrations and distribution maps were produced, nearly always for the first time, for nearly all of the species recognized. The taxonomic conclusions are those of the first author while the county distribution maps were produced by K.A. Dvorsky, working from the UWO database of specimens.

Difficulties working with series *Pulcherrimae* stem from certain problems in working with Beadle's text, particularly his imprecise description of leaf shapes as exemplified by his use of the phrase "leaf margins lobed and incised, leaves ovate" (or very similar) for nearly all taxa, although inspection nevertheless demonstrates some clear and striking differences in leaf shape. Indeed, this shape characteristic proves to be the main taxonomic discriminator between species as recognized in this paper, rather than Beadle's emphasis on fruit colour (red and yellow being usual in the series), fresh anther color, or flower size which do not seem to correlate sufficiently well with other characters to be generally useful. Furthermore, most collectors, including Beadle, have not recorded color characters with their label data, making them especially difficult to use with herbarium material. UWO collections are among the few that routinely record these characters. Another problem is that series *Pulcherrimae* does not seem to be particularly common except in sporadic favored locations. It is difficult to tell how much more abundant members of the series were in Beadle's time, but, although a number of label annotations indicate very high abundances, i.e., 'thousands' (very unusual today), the main collectors of this period, Beadle himself and Harbison, Biltmore's collector, collected few specimens that survive other than the early collections associated with the protologues. Thus it is essentially impossible to infer the level of change in frequency over the last 100 years or so.

Apomixis, polyploidy and perhaps hybridization (Phipps, 2005) contribute to taxonomic difficulty in *Crataegus* but so far no one has studied breeding systems in ser. *Pulcherrimae*, and only two chromosome counts or ploidy level estimates exist. Talent and Dickinson (2005) report a triploid ploidy level from an unidentified species and Longley (1924) a triploid count from *C. pinetorum*. One cannot generalize from so little information. Hybridization is first suggested by morphological intermediacy and as such there is no definite suggestion of it occurring in ser. *Pulcherrimae*.

This is, therefore, a somewhat provisional treatment of ser. *Pulcherrimae* and because of the problems noted it is necessarily grounded in the work of Beadle, the only previous worker who has paid serious attention to the group. In attempting to place all of Beadle's 1902 and 1903 names in his groups *Pulcherrimae* and *Sargentianae* into the synonymy for this paper I have occasionally come up with only a possible, rather than a definite match. This itself speaks to difficulties of species level synonymy in series *Pulcherrimae*. Further, whereas most specimens can be more or less straightforwardly accomodated in the taxa that I recognize here, there is a general residue of about 3% (see Appendix of Cited Specimens) of specimens of adequate quality where this is less straightforward. Because of this somewhat provisional state of the taxonomy, we also provide a map to the collective distribution of the series (Fig. 1). Thus, this will not be the last word on ser. *Pulcherrimae* and even more collecting as well as some combination of morphometric work, biosystematic investigation and molecular studies will be needed to stabilize the understanding of all its species. It is therefore to be hoped that a competent systematist, preferably conveniently based in the southeast, will be encouraged by the platform presented here to carry out such work.

This paper is a continuation of the first author's studies of *Crataegus* in the southeastern United States, examples of which are Phipps (1988) and Phipps and Dvorsky (2006). Because these papers were originally intended to provide the detailed backup for the first author's treatment of *Crataegus* in the southestern United States for Cronquist's now defunct flora of that area, our meaning of "southeastern United States" here is identical to Cronquist's, ie. Louisiana and Arkansas are the western limits for that flora. Texan records are, however, added but only because a few species are of sporadic occurence in the extreme southeast of that state.

The text continues with the formal taxonomic presentation.

TAXONOMY

Series **Pulcherrimae** Beadle ex K.R. Robertson, J. Arnold Arbor. 55:628.1974. TYPE species: *Crataegus pulcherrima* Ashe, *Pulcherrimae* Beadle, group without rank or description, Biltmore Bot. Stud. 1:66. 1902; *Pulcherrimae* Beadle ex Sargent, in clavem, Man. Trees North Amer. 1:400. 1905; group *Pulcherrimae* E.J. Palmer, in clavem, J. Arnold Arbor. 5:78. 1925.

Note.—Robertson attributed sectional rank for this group by Palmer (1925), but I argue that Palmer was not formally using the rank section there (Phipps, Harvard Pap. Bot., submitted).

Sargentianae Beadle, group without rank or description, Biltmore Bot. Stud. 1:59.1902.

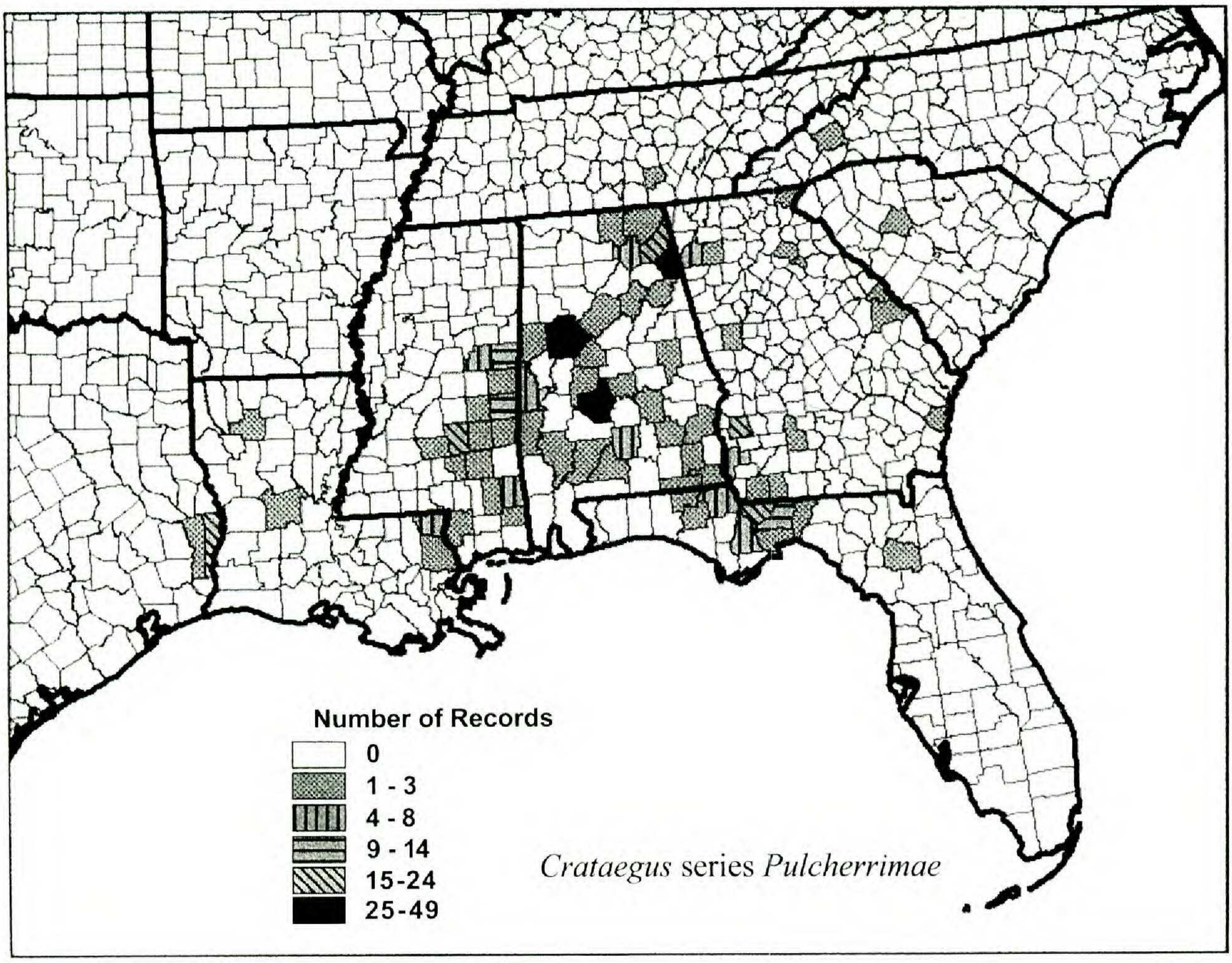

Fig. 1. County level distribution map of *Crataegus* series *Pulcherrimae* from collated records.

Shrubs or small trees; 1-year old twigs shiny golden-tan to shiny deep reddish-brown; 2-yr old twigs deep gray; thorns mostly 2–3 cm long, fine, very dark at 2 yr. Leaves deciduous, long-petiolate; petiole glabrous, bearing a few to several, sometimes stipitate, glands; blades 4–7 cm long, ovate to ovate-rhombic or narrow-ovate in general outline, unlobed or more frequently with 4–6 shallow lobes per side, sometimes all of the lobes or only the upper, obscure, lobe tips blunt to acute; venation craspedodromous, 4–11 veins per side; ± glabrous. Inflorescences 5–10 flowered slightly domed panicles; branches glabrous, bearing often plentiful, caducous, membranous, linear, gland-margined bracteoles. Flowers 14–18 mm diam.; hypanthium externally glabrous; calyx-lobes narrow-triangular, glandular-serrate to nearly entire; petals ± circular, white; stamens 20, anthers usually pink to purple, sometimes cream (e.g. *C. venusta*); styles 2–5. Fruit 5(Beadle)–13 mm thick, pyriform to ± orbicular, glabrous, yellow, orange, ruddy, red, red-purple or green; calyx lobes usually reflexed on a short collar; pyrenes 2–5. Mature bark deeply corrugated at least in some.

Series *Pulcherrimae* occurs from the Gulf Coast of eastern Texas to northern Florida. Its species are collectively fairly common over much of Mississippi and Alabama as well as the western part of Georgia. There are also sporadic records east to South Carolina, one record in southern Tennessee and one locality for North Carolina in Buncombe County. Ten definite and one possible species are recognized here.

For the whole series, flowering is in April through much of Mississippi, Alabama and Georgia but, in panhandle Florida, it may start late March and in North Carolina or Tennessee in May. According to the season, typical timing may be retarded or speeded up by cooler or warmer weather than normal. The south-north progression is typical for spring flowering plants in the region (e.g. Reader et al. 1974). Fruit is ripe anywhere from late August to early October and its retention past the early stages depends on the mesicity of the site and seasonal weather until full ripeness makes the fruit attractive to frugivores.

Related species of *Crataegus* usually show little or no habitat variation in their physical habitat such that niche differentiation, if it exists, must be based on other characteristics. Series *Pulcherrimae* is normative for the genus in this respect as far as present observation indicates and the plants are woodland edge or woodland species of mesic localities, if the latter, usually under oak or oak-mixed canopy but not in the denser shade. Soil type preference for the mesomorphic members of the genus is also not normally pronounced with the exception of avoiding coarse-grained or more acid soils. Species of ser. *Pulcherrimae* are mainly recorded on the finer-grained soils. A reviewer makes the suggestion that the distribution of *C. venusta*, however, may be restricted to blackland soils, a soil type that certainly harbors hawthorns, but this cannot be confirmed from data available to me. Three of the mechanisms for niche differentiation in *Crataegus* are: differential anthesis timing, different pollinator preference and fruit differentiation (color, time of ripening, size, perhaps taste) and several of these differences do occur with ser. *Pulcherrimae* but have not been investigated further. Differences in anthesis time in sympatric *Crataegus* may be very large, up to six weeks, but usually correlate to taxononomic distance (for more on this see Phipps 1995, on hybridization), so they likely do not initiate niche differentiation. In the case of ser. *Pulcherrimae* different taxa that occur at the same site do sometimes have slightly different, but overlapping, anthesis time but there is no consistent recording of this. There is also an untested suggestion that differences in fresh anther color (basically, anthocyanic or not) may affect pollinator faithfulness, thus beginning niche differentiation. In this respect it is interesting that such color differences quite often appear in very closely related taxa, though they are not particularly frequent within single species. There is a huge field of study here awaiting attention by an enterprising biologist but it clearly needs preceeding by a plausible taxonomy against which it can be tested.

The deeply corrugated bark of several species, found in few other series, glabrous or nearly glabrous plant parts (except in one aberrant specimen), about 20 stamens, rather glandular-bracteolate inflorescences, usually spreading, somewhat elevated calyx-lobes in fruit, and sometimes large numbers of lateral veins in the leaf make this series distinctive. It is thus a quite easily recognized series, except for its differentiation from ser. *Intricatae*, which latter normally possesses 10, not 20, stamens as in ser. *Pulcherrimae* and has some very hairy species. As in series *Intricatae*, yellowish-fruited forms are at least as numerous as red-fruited ones.

Notes on terminology:

1. This paper uses the term 'leaf incision index,' abbreviated to LII, for the relative depth of sinuses. This is measured by joining the lobe tips and projecting a line from there through the deepest part of the sinus, parallel to the adjacent veins, to the mid-vein. A one hundred percent value indicates cut through to the mid-vein, 50% cut half-way, cut 25% of the way to the mid-vein.
2. "Leaf' always refers to short-shoot leaves unless indicated otherwise.

KEY TO SERIES *PULCHERRIMAE*

A. Inflorescence branches glabrous ______ [series **Pulcherrimae,** sens. str.].

1. Well-developed short-shoot leaf blades fairly narrow, 1.5–2 × as long as broad.

2. Well-developed short-shoot leaf-blades narrow-elliptic to narrow-ovate in general outline; lobes absent or very shallow, perhaps some notches with LII 5% or even 10%, but if so not regularly occurring in all or most leaves; lateral veins 6–10/side.

3. Leaf blades broad-elliptic to narrow-ovate in general shape; apices subacute to blunt; margins with crenate or crenate-serrate teeth; fruit red ______ **3. C. mendosa**

3. Leaf blades narrow ovate to lanceolate in general shape; apices acute to acuminate; marginal teeth sharply acute; fruit yellowish ______ **2. C. gilva**

2. Well-developed short-shoot leaf blades broad-elliptic or broad-oblong to narrow-ovate in general outline; regularly and distinctly lobed; max. LII 10–40%; main lateral veins 4–6/side.

4. Lobes 2–3 per side, blunt, max. LII <15% ______ **4. C. pulcherrima**

4. Lobes 2–5 per side, blunt or acute, max. LII <15–25% or more.

5. Leaf blades narrowly elliptic to very narrow-ovate in general outline; 1–2 (–3) shallow, acute lobes per side, max. LII usually <15% ______ **5. C. pinetorum**

5. Leaf blades narrowly ovate in general outline; 4–5 deep, acute to subacute, usually narrow-cuspidate lobes per side, max. LII often 25% or more ______ **9. C. incilis**

1. Well-developed short-shoot leaf blades broader in proportion, generally < 1.5× as long as wide.

6. Many leaves of a distinctive type, ± trullate-ovate in general shape, the terminal half ± straight-sided across lobe-tips; 4–6 cm long; lobes 1–3/side, sharp, but very small to small (max. LII 2–10%(–15%)); 5–7 lateral veins/side; anthers pink; fruit yellowish ______ **1. C. sargentii**

6. Leaves of quite different construction; if with few, short, very acute lobes then blades more ovate or oblong in form and the terminal half not ± straight-sided across the lobe tips; length various; lobes nearly always much more pronounced, at least at maturity; venation various; anthers ivory to cream or pink to purple; fruit yellowish or reddish.

7. Leaf blades with well-marked lobes, max. LII usually 15–25%, occasionally more.

8. Blades usually smaller, 3–5(–8) cm long, ovate to broad-ovate in general shape; lobes angular or not; anthers and fruit various colors.

9. Majority of leaves broad-ovate in general shape with 4–5 lateral veins per side and 3–4 lobes; lobes short or longer (max. LII 10–40%).

10. Lobes ± blunt, generally fairly short (m3max. LII 20–40%) ______ **8. C. tecta**

9. Majority of leaves ovate in general shape with 5–8 lateral veins per side and 4–6(–7) lobes; lobes fairly short, obtuse to acute (max. LII 10–40%) ______ **7a. C.** cf. **opima**

8. Blades large, 5–8 cm long, rhombovate in general shape; lobes very angular; anthers cream; fruit red ______ **10. C. eximia**

7. Leaf blades with shallow lobes, max LII 5–10%.

11. Lobes quite sharp.

12. Leaf blades broad-oblong to oblong-ovate; lobes and teeth acuminate during development, sometimes reflexed ______ **6. C. venusta**

12. Leaf blades narrow ovate to ovate-oblong; tips of lobes and marginal teeth less pronounced.

13. Leaf blades ovate-oblong in general shape; angle at leaf-tip broad, ca. 90° ______ **6. C. venusta, 'pallens'** form

13. Leaf blades narrow-ovate in general shape; angle at leaf-tip sharp, 60° or less ______ **2. C. gilva**

11. Lobes blunt to subacute.

14. Leaf blades generally large at maturity, mostly 5–8 cm long; lateral veins 5–7 per side; blades nearly unlobed to shallowly lobed; bases cuneate ______ **3a. C.** cf. **C. mendosa**

14. Leaf blades small to medium-sized, rarely many > 5 cm long; lateral veins 4–7 per side; blades regularly lobed, but sometimes shallowly; bases cuneate to rounded.

15. Leaf blades cuneate at the base, most blades approximately 1.5:1 ____________ **4. C. pulcherrima**

15. Leaf blades broad-cuneate to rounded at the base, blades <1.5:1 ______ **7. C. opima**

B. Inflorescence branches pubescent ________________________________ **C. craytonii** ser. **Intricatae]**

1. Crataegus sargentii Beadle, Bot. Gaz. 28:407. 1899. (**Fig. 2.**) TYPE: U.S.A. ALABAMA. De Kalb Co.: Valley Head, 20 Sep 1899, *C.D. Beadle 1289* (LECTOTYPE selected here: US 969465; ISOLECTOTYPE: US 969466).

?=*Crataegus assimilis* Beadle, Biltmore Bot. Stud., 1:68. 1902. TYPE: U.S.A. FLORIDA. Jackson Co.:Chattahoochee, 8 Apr 1901, *T.G. Harbison H4096* (LECTOTYPE selected here: US 969401).

Shrubs or small trees 3–5 m tall; extending twigs glabrous, reddish; at 1 yr. shiny deep reddish-brown, 2 yrs grayish-red, older gray; thorns 2–5 cm long, few to numerous, slender, straight to slightly recurved, black at 2 yrs. Leaves: petioles 25–40% length of blade, slender, glabrous, with a few sessile glands; blades 4–6(–7) cm long, ovate-trullate in general outline; tip acute to acuminate, base rounded to broad cuneate; sides barely or shallowly 1–3 lobed; lobes acute, max. LII usually 0–10%; upper third of leaf often unlobed; margins finely and sharply serrate with numerous very small teeth usually ≤ 1 mm long; venation craspedodromous, with 5–7 main lateral veins/side; leaves glabrous except for scattered hairs on the veins above when young. Inflorescences 4–10(–11) flowered; branches glabrous, bearing numerous, caducous, linear, often somewhat curved, membranous to subherbaceous (green), gland-margined bracteoles; anthesis late March (Gulf Coast) to mid-April (Alabama canyon lands). Flowers 15–18 mm diam.; hypanthium externally glabrous; calyx-lobes 3 mm long, narrow-triangular, flaring to a broad base, tip somewhat obtuse, margins entire to glandular-denticulate, abaxially glabrous; petals ± circular, white; stamens 20, anthers pale pink to pale purple; styles 3–4. Fruit 8–10(–12) mm diam., subglobose, yellow or flushed pink (occ. reddish); calyx lobes reflexed, on an elevated collar; nutlets 3–4, dorsally grooved, sides plane.

Common name.—Sargent's hawthorn

Habitat and Distribution.—Our records are mainly from Alabama, extending west to central Mississippi, south to panhandle Florida and eastwards with scattered records from Georgia (Fig. 3). It is a locally common species of woodland edges, cut-over woodland and other open woodland.

Comment.—*Crataegus sargentii* was the first species to be described in the series and this account appears to be the first to characterize it fully. It is most similar to *C. gilva* but that species has narrower leaves and smaller fruit. Occasional more deeply lobed forms (LII ca. 15%) may resemble other species to some extent, but they will normally retain the characteristic overall leaf-form of the species.

2. Crataegus gilva Beadle. Biltmore Bot. Stud. 1:60. 1902. (**Fig. 4**). TYPE: U.S.A. ALABAMA. Marshall Co.: rocky woods, Apr 1901, *T.G. Harbison 4374* (LECTOTYPE selected here: A).

Shrubs or small trees 2–5 m tall; extending shoots glabrous, reddish when young; at 1 yr deep reddish-brown, older dark dull gray; thorns fine, 2–4 cm long, straight or slightly recurved, dull purplish-brown at 2 yr. Leaves: petioles slender, ca. 20–30% length of blade, adaxially grooved, ± glandular; blades 3.5–4.5 cm long, broad-lanceolate to narrow-elliptic or very narrow ovate to narrow ovate or narrow ovate-rhombic; tip acute to acuminate and with 0–3 acute lobes per side these with max. LII usually ≤ 15%; margins sharply fine-serrate or occasionally with quite large teeth; venation craspedodromous, lateral veins ca. 5–7(–9) per side on average or larger short-shoot leaves; glabrous above and be-

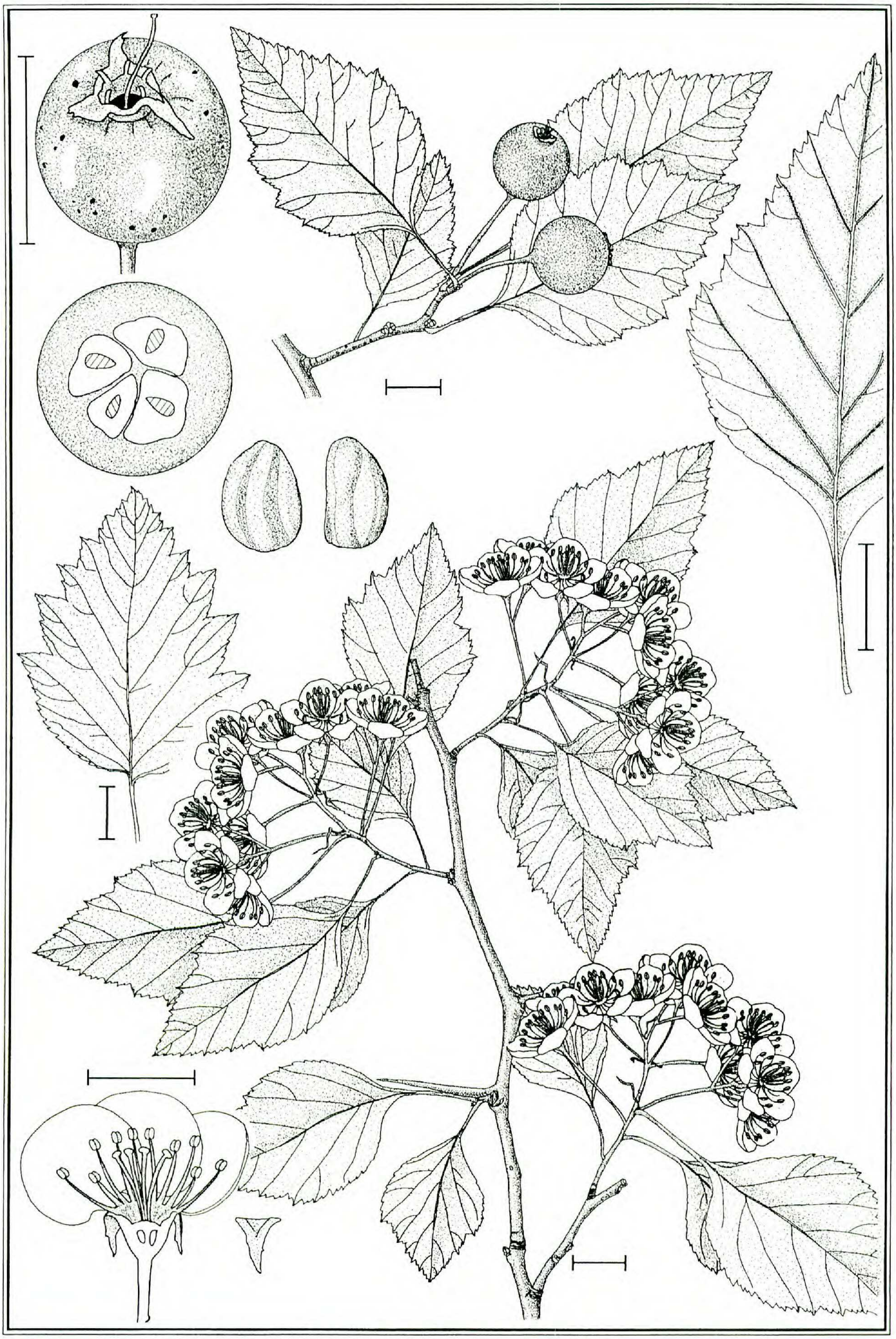

FIG. 2. Line drawing of *Crataegus sargentii* from flowering specimen *Ulf Hansen PF037* (UWO) and fruiting specimen *Lance 2171* (UWO); single leaf at left from extension shoot. Scale bars = 1 cm. S. Laurie-Bourque del.

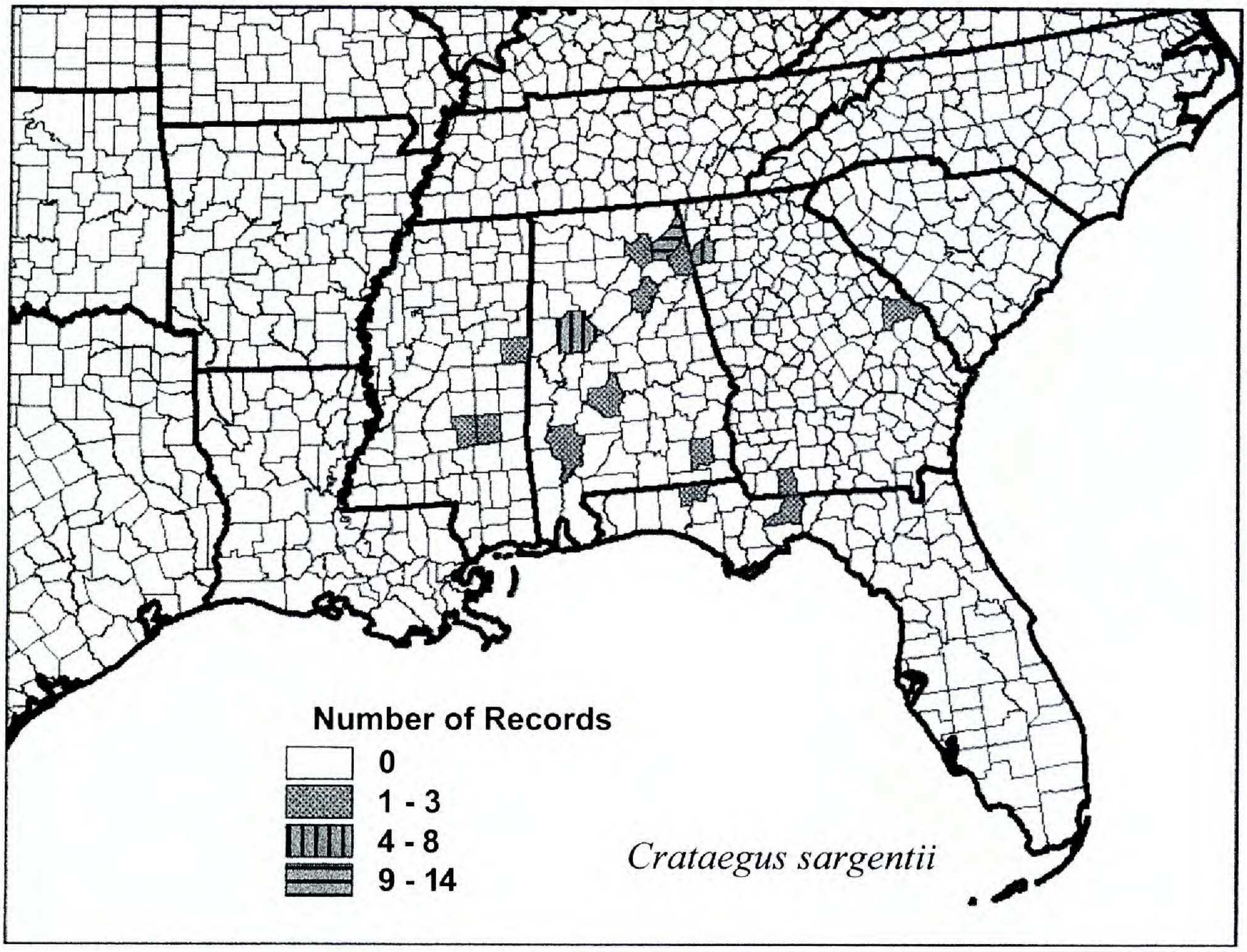

Fig. 3. County level distribution map of *Crataegus sargentii* from collated records.

low except for some hairs on the veins above especially when young. Inflorescences usually 3–7 flowered; branches glabrous, densely beset with caducous, narrow-oblong to very narrow obovate, membranous to subherbaceous, densely gland-margined bracteoles. Flowers (13–)18–20 mm diam.; hypanthium externally glabrous; calyx-lobes 6–7 mm long, narrow triangular, margins glandular-serrate; petals ± circular, white; stamens 20, anthers pale pink; styles 3–4. Fruit ca. 5–8 mm wide at maturity, ± orbicular, greenish yellow to yellow; sepals ± reflexed; nutlets 3–4.

Habitat and Distribution.—*Crataegus gilva* occurs from Mississippi to Georgia and northern Florida (Fig. 5), in woodland edges and gaps, clear-cuts and pine-oak woodland.

Comment.—*Crataegus gilva* leaves are rather like a sharp-tipped *C. mendosa* and and somewhat resemble a much less clearly lobed *C. pinetorum*. The leaves are also usually somewhat like a proportionately narrower *C. sargentii* and in the flowering Type they are narrow-elliptic, acuminate at the tip, cuneate at the base, virtually devoid of lobes and have particularly large marginal teeth, this being the most extreme specimen of the species seen. The suspicion that *C. gilva* may represent an extreme form of *C. sargentii* is heightened by the almost complete lack of known fruiting specimens of the species, the fruiting co-type excepted (*Harbison 4374/2*), which specimen, therefore, does suggest the possibility that the leaves often widen after anthesis.

3. **Crataegus mendosa** Beadle, Biltmore Bot. Stud. 1:65. 1902. (**Fig. 6**). TYPE: U.S.A. ALABAMA. Marshall Co.: near Albertville, 18 Oct 1901, *T.G. Harbison 5219* (= *4336/2*) (lectotype selected here: US 969431).

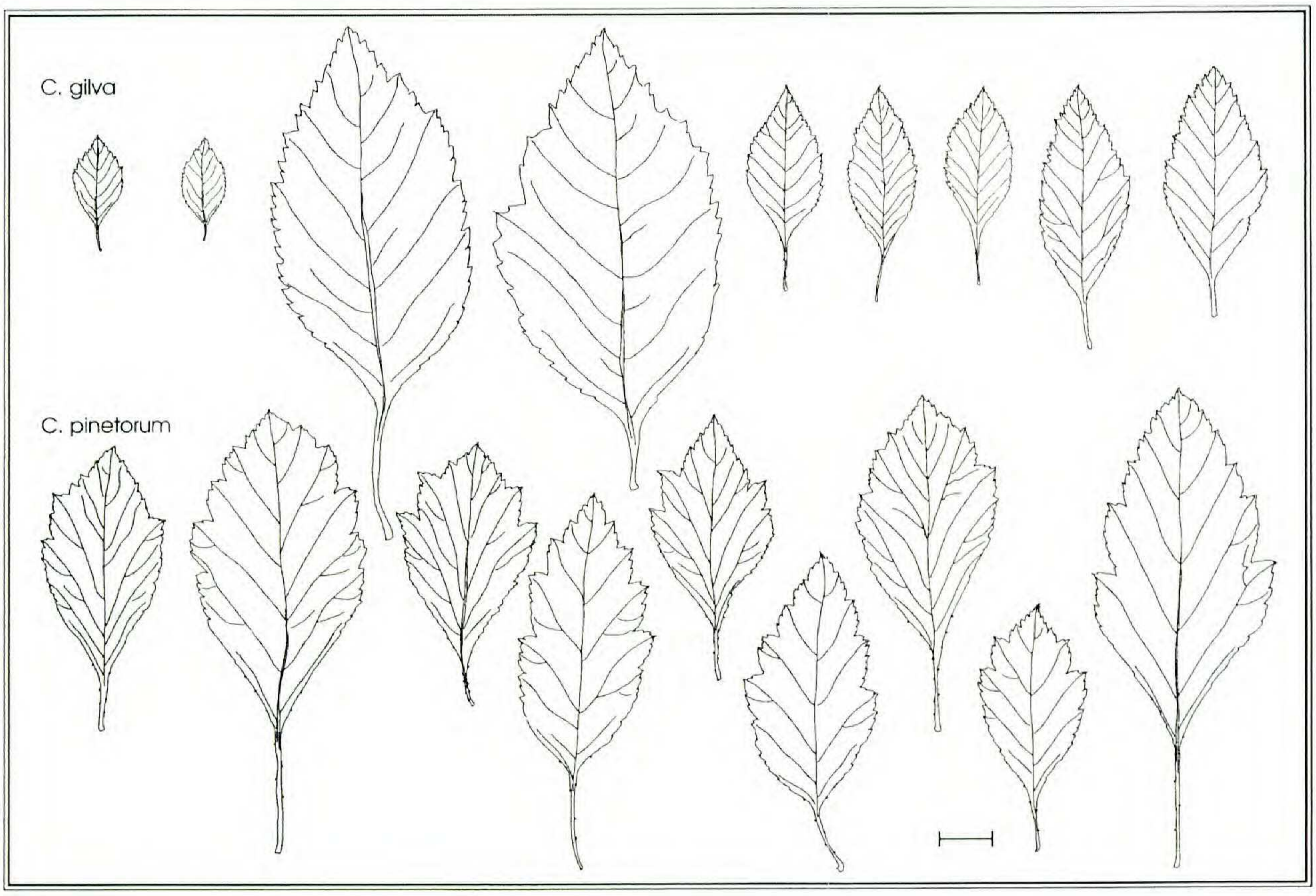

Fig. 4. Line drawing of leaf spectra of *Crataegus gilva* (top row) from *Lance s.n.* (UWO) and *Phipps 7937a* (UWO) and *C. pinetorum* (bottom row) from, left to right, *Lance 2174* (UWO), *Phipps 8173* (UWO) and *Phipps & O'Kennon 8042* (UWO). Scale bars = 1 cm. S. Laurie-Bourque del.

Shrubs or small trees 3–6 m tall; bark of trunk not recorded; 1-yr old twigs shiny reddish or purplish brown, older dark or dull gray; thorns 2–5 cm long, fine, straight or slightly recurved, reddish black at 1 yr, frequent to absent. Leaves: petioles 30–50% length of blades, dorsally furrowed, bearing a few small glands; blades 4–7 cm long, 2–3 cm wide, broad-oblong to elliptic or narrowly ovate; unlobed or with a few obscure lobes; apex subacute to blunt on some larger leaves, cuneate at the base; margins with numerous, small, sharp teeth; lateral veins 8–9 per side (fewer on smaller leaves), venation craspedodromous; glabrous except for a few hairs on the midvein abaxially when young, dark green. Inflorescences 4–7 flowered; branches glabrous, densely beset with caducous, narrow, semi-herbaceous and green to membranous, gland-margined bracteoles. Flowers 14–17 mm wide; hypanthium externally glabrous; calyx lobes triangular, abaxially glabrous, margins glandular-denticulate; petals ± circular, white; stamens 20, anthers pink or pink-purple; styles 3–5. Fruit 8–10 mm diam., ± orbicular to broad ellipsoid, yellow-green with pink or salmon blush, or red (Beadle); calyx lobes reflexed; nutlets 3–5, dorsally furrowed, laterally smooth.

Habitat and Distribution.—Scattered from extreme southeastern Texas to western Georgia and northern Florida with a disjunct record in South Carolina (Fig. 7), *Crataegus mendosa* is a plant of woodland edges, cut-over woodland and brushy places.

Comment.—*Crataegus mendosa* is one of the more distinctive members of the series although it is approached in form by *C. gilva*, which, however, has an acuminate leaf-tip and much sharper lobes (if present) and marginal teeth. The extension shoot leaves of *C. mendosa* are ovate to broad-ovate in outline with 3–4 sub-acute to acute lobes that are usually quite broad and this can confuse if there are only few typical short-shoot leaves present.

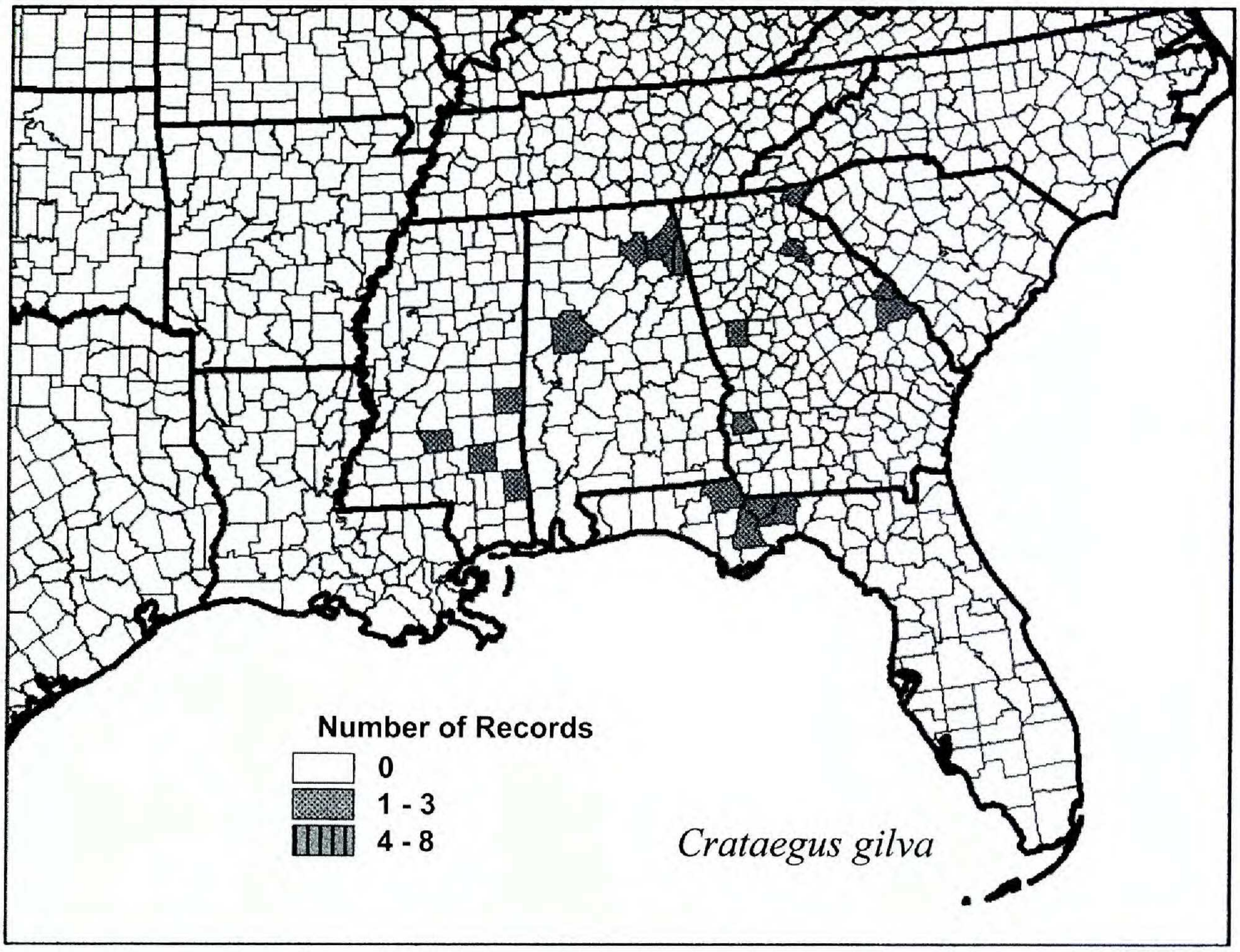

FIG. 5. County level distribution map of *Crataegus gilva* from collated records.

3a. Crataegus cf. **mendosa** Beadle

Shrubs or small trees 3 m tall; mature bark not recorded; extending twigs glabrous, reddish; at 1-yr shiny reddish-brown; older duller dark gray; thorns often on material seen. Leaves: petioles ca. 33% length of blade, glabrous, glandular, adaxially grooved; blades 5–7 cm long, mostly broad-elliptic in general shape; apex subacute, base cuneate to broad cuneate; 0–3 lobed per side, lobes obtuse to subacute, max. LII usually 5–10%; margins serrate; venation craspedodromous, ca. 6 main lateral veins per side; both surfaces glabrous. Inflorescences not recorded. Young infructescences with 2–5 fruit, branches glabrous. Young fruit 7–10 mm diam., subglobose to ± pyriform, green, glabrous; filament bases ca. 20; sepals mainly erose; nutlets ca. 4.

Habitat and Distribution.—Only known from one locality in Alabama, where it is recorded from 'bottoms' from where three fine duplicates at DUKE, GA and NO of *Demaree 50656* (MS: Alabama: Dallas Co., White Oak Creek, P.O. Sardis, 29 June 1964) show a plant intermediate between *C. mendosa*, *C. opima* and *C. pulcherrima* but which cannot be confidently placed with any. More material is needed.

4. Crataegus pulcherrima Ashe, J. Elisha Mitchell Sci. Soc. 16:77. 1900. (**Fig. 8**). TYPE; U.S.A. FLORIDA. Gadsden Co.: River Junction, 10–11 Aug 1895, *G.V. Nash 2377* (LECOTYPE selected here: DOV 4634; ISOLECTOTYPE: US 250142). I have selected from Ashe's co-types the specimens with better foliage and fewer fruit rather than more fruit and poorer foliage.

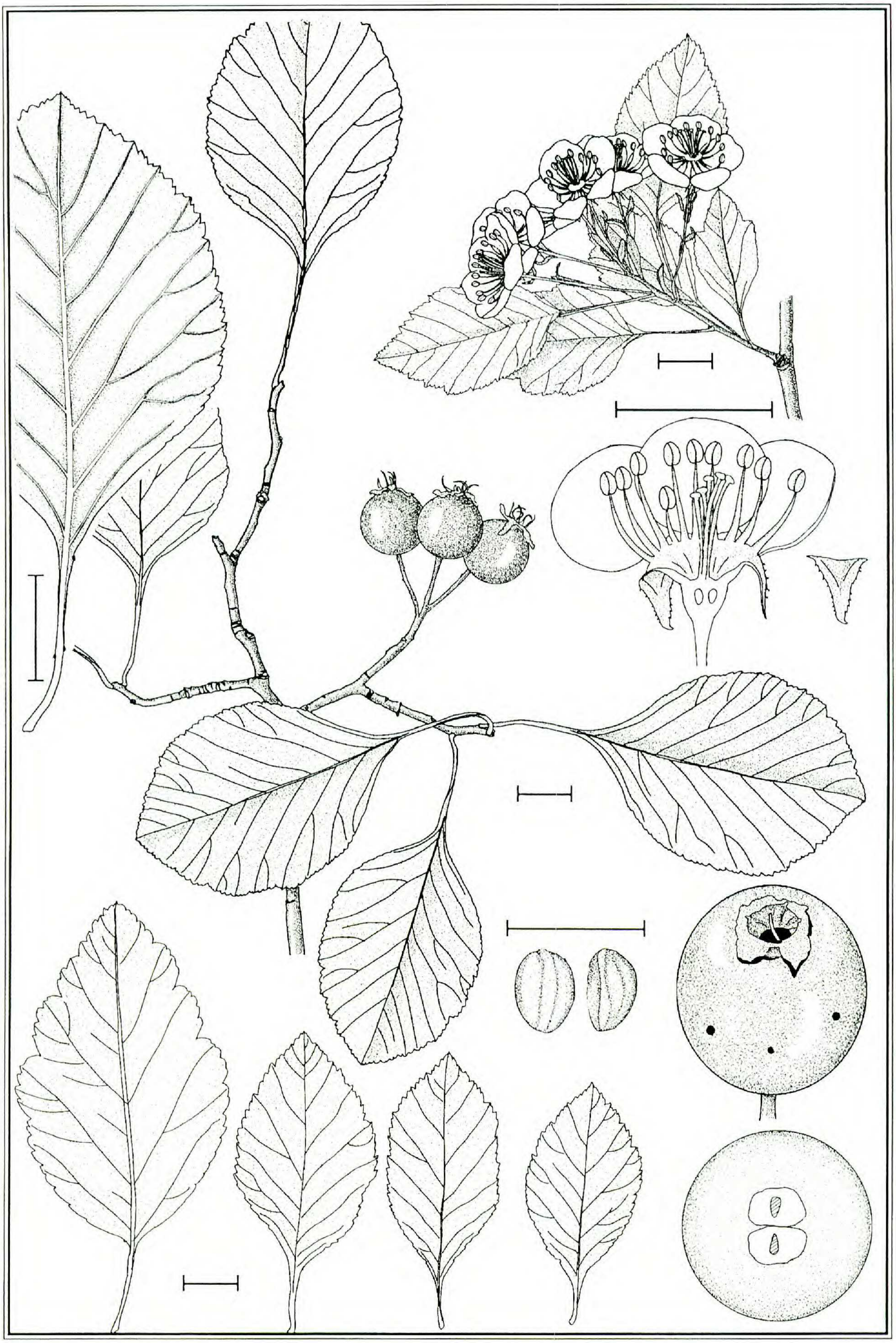

FIG. 6. Line drawing of *Crataegus mendosa* from flowering specimen *Phipps & O'Kennon 7939a* (UWO) and fruiting specimens *Phipps et al. 8088*, *Smith 129* and *Lance 2176* (UWO). Scale bars = 1 cm. S. Laurie-Bourque del.

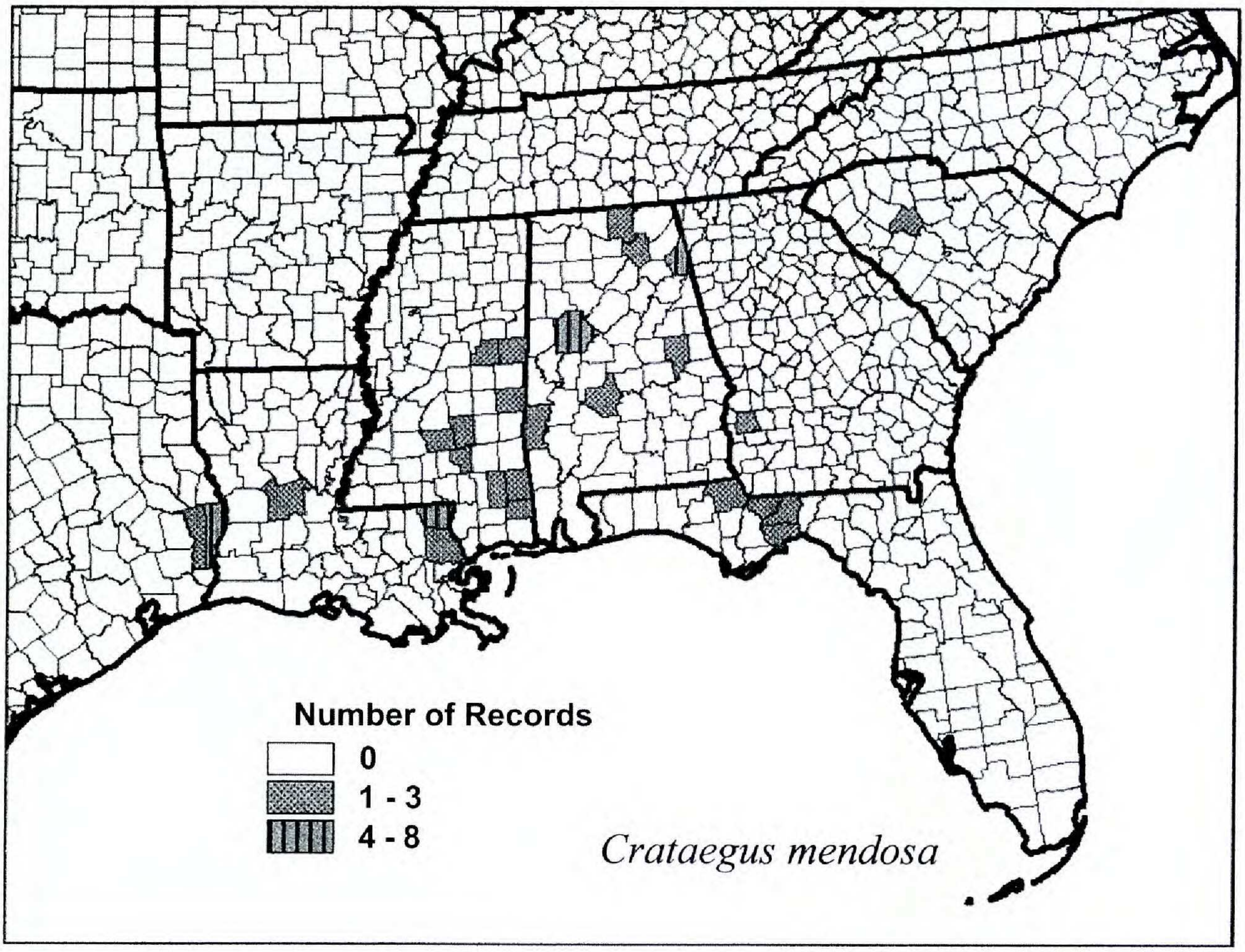

Fig. 7. County level distribution map of *Crataegus mendosa* from collated records.

?=*Crataegus robur* Beadle, Biltmore Bot. Stud., 1:69.1902. Type: U.S.A. Florida. Leon Co.: Tallahasee, 18 Sep 1901, *C.D. Beadle 2051* (lectotype selected here: A).

Shrubs, 2–4 m tall; extending twigs glabrous, green or reddish-tinged; at 1 yr. reddish-black; at 2 yr. dark gray; thorns at 2 yr. 2–3.5 cm long, blackish, fine, ± straight. Leaves: petioles 1–2 cm long, slender, glabrous, glandular, glands sessile or stipitate; blades 2.5–5.0 cm long in our material, narrow ovate or ± oblong through narrow obovate or narrow rhombic in general shape, with 2–4 shallow obtuse to subacute lobes per side; tips acute, bases cuneate; margins serrate with small teeth, somewhat distant for their size; venation craspedodromous with 4–5(–6) main lateral veins per side; glabrous above except for along the main veins adaxially young, glabrous below; thin. Inflorescences 4—7-flowered with a very short central axis; branches glabrous, bearing plentiful, small, caducous, oblong, membranous, stipitate-gland-bordered bracteoles; anthesis mid-April. Flowers 15–20 mm diam.; hypanthium externally glabrous; calyx lobes 3–4 mm long, narrow-triangular, margins glandular-serrate, abaxially glabrous, tip obtuse; petals ± circular, white; stamens 20, anthers small, pink; styles ca. 3. Fruit in clusters of 2–5, 6–7 mm diam., glabrous, deep yellow sometimes flushed red, occasionally purplish-red; calyx lobes reflexed, on a short collar; nutlets ca. 3, dorsally grooved, sides plane.

Common name.—Beautiful hawthorn.

Habitat and Distribution.—Mississippi to Georgia and northern Florida (Fig. 9). Open, rocky woodlands (JBP) and swamp borders (Beadle), scarce.

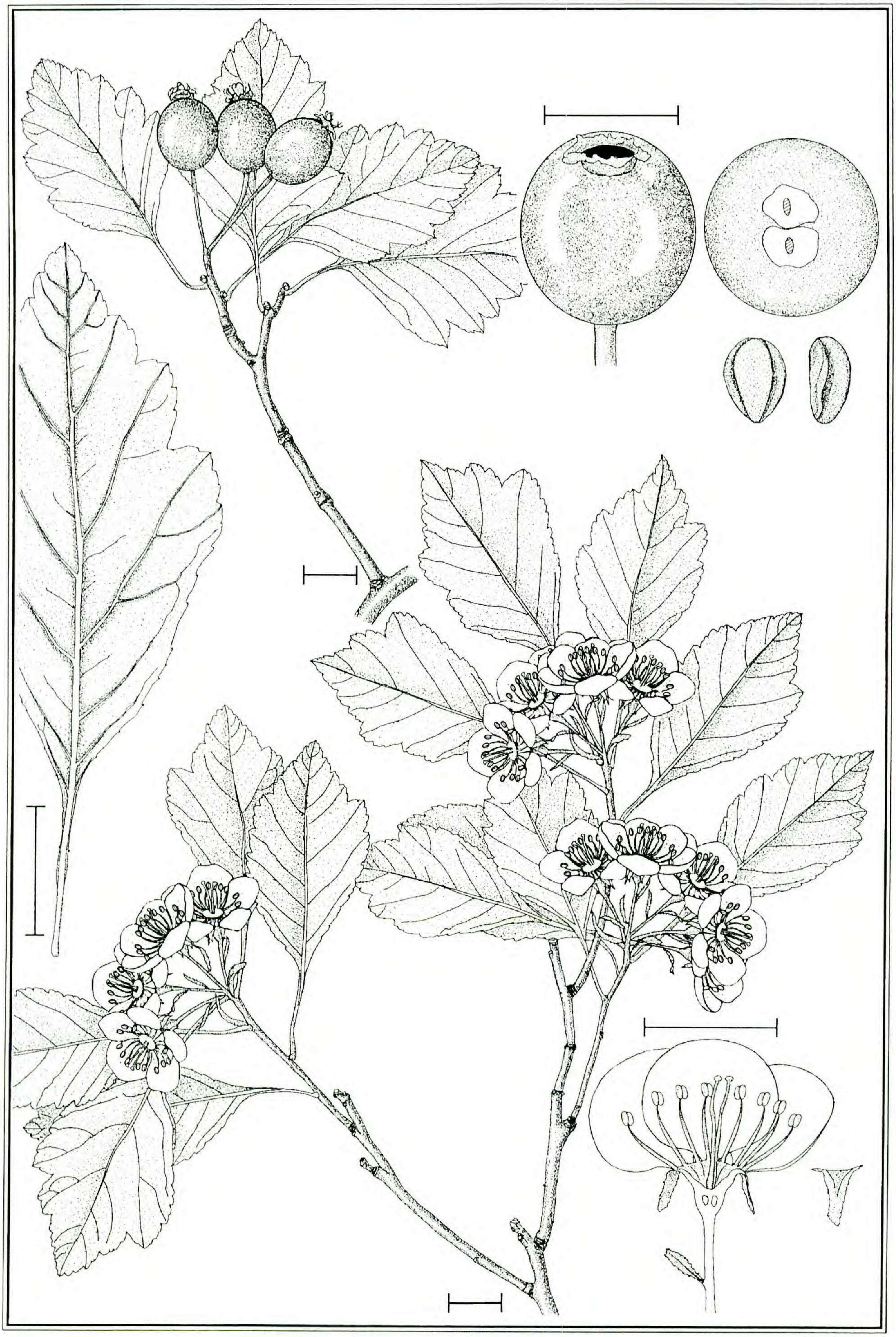

FIG. 8. Line drawing of *Crataegus pulcherrima* from flowering specimen *Norris 705* (IBE) and fruiting specimen *Phipps et al. 8091* (UWO). Scale bars = 1 cm. S. Laurie- Bourque del.

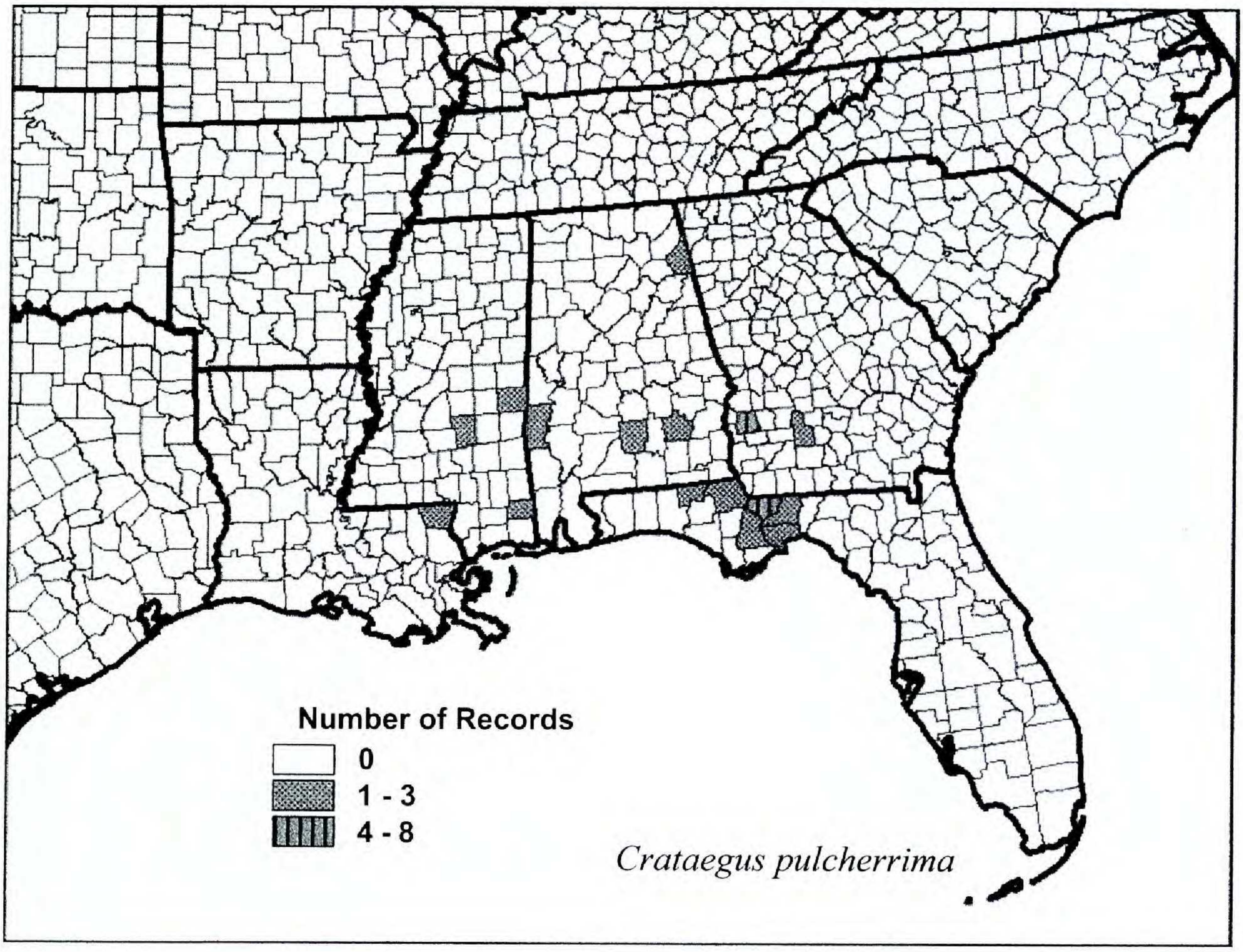

Fig. 9. County level distribution map of *Crataegus pulcherrima* from collated records.

Comment.—The type species of its series was described by Ashe as having 10 stamens but neither of Ashe's co-types (*Nash 2377* and *Nash 2568*) from River Junction, Florida confirm this. This species is usually quite easy to distinguish though occasionally it resembles *Crataegus* cf. *opima*.

5. Crataegus pinetorum Beadle, Bot. Gaz. 28: 343. 1900. (**Fig. 4**). TYPE: U.S.A. ALABAMA. De Kalb Co.: De Soto State Park, 25 Sep 2001, *R. Lance 2174* (NEOTYPE selected here: UWO; ISONEOTYPES: Anniston Nat. Hist. Mus., UNC, JSU).

Shrubs or small trees 2–6 m tall; extending twigs glabrous, with a strong reddish cast; at 1 yr shiny reddish-brown; dull gray-brown at 2 yr; older dull gray; thorns usually present, mainly 2–3.5 cm long, fine, ± straight, shiny black or reddish-black at 1 yr, becoming black. Leaves: petioles 25–30% of leaf blades, glabrous, sparsely to densely glandular or even stipitate-glandular, abaxially grooved; blades 4–6 cm long, nearly full-grown at anthesis, narrowly ovate to elliptic in general shape; tip acute, base cuneate; lobes usually 2–3 per side, fairly shallow (max. LII 10–20%), acute; marginal teeth extremely small, acute; venation craspedodromous, main lateral veins 5–6 per side; glabrous adaxially and abaxially. Inflorescences 2–4-flowered; branches glabrous, bearing plentiful, ± persistent, very narrowly obovate, chartaceous to subherbaceous, densely gland-margined bracteoles. Flowers at anthesis not known; hypanthium externally glabrous; calyx lobes ca. 6 mm long, narrow triangular, margins finely glandular-serrate, abaxially glabrous; petals not known; stamens 20, anther color not known; styles porly persistent. Fruit 12–

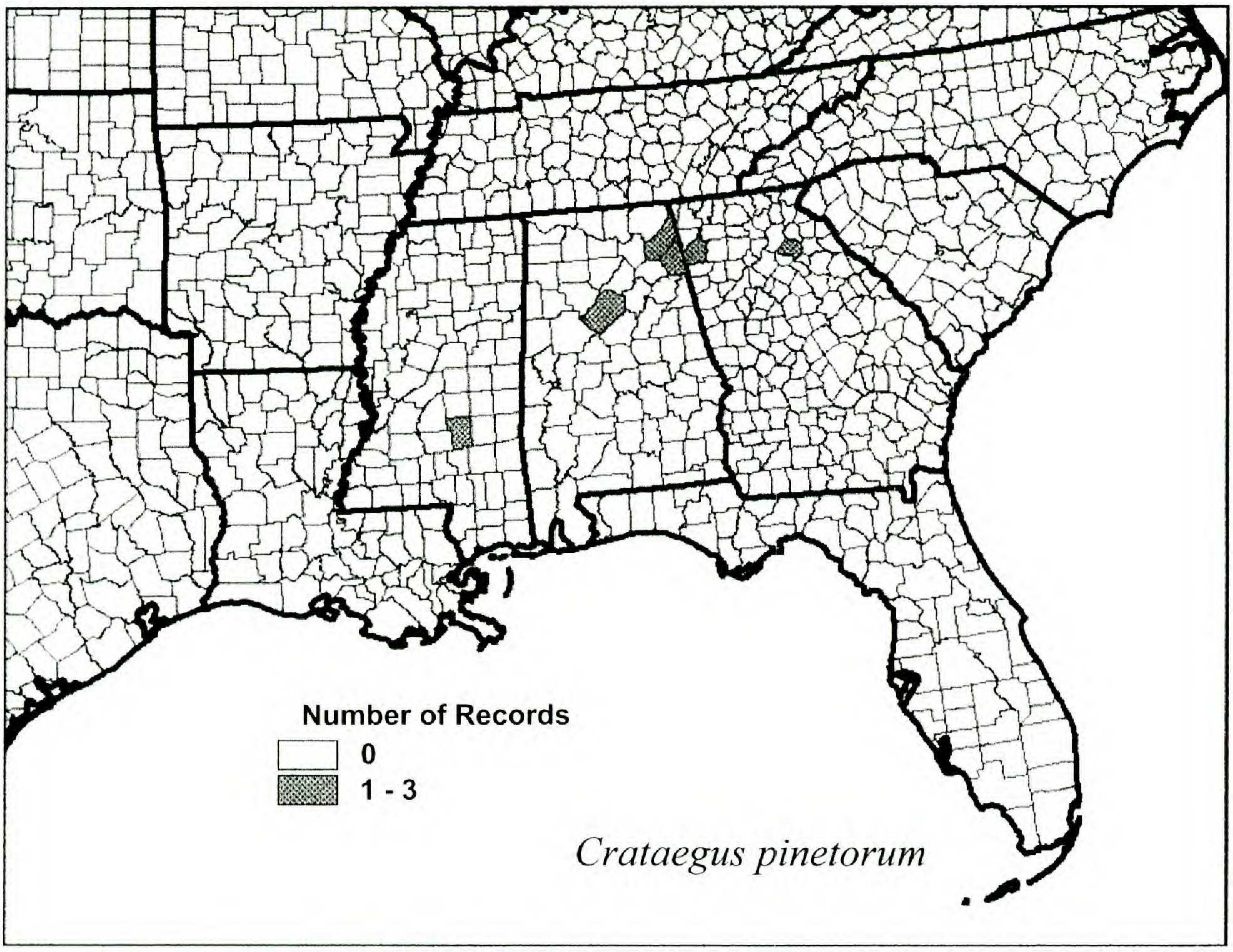

Fig. 10. County level distribution map of *Crataegus pinetorum* from collated records.

14 mm long, subglobose, dull red; calyx lobes erose on only specimens with mature fruit; nutlets 2–4, dorsally grooved, sides plane.

Habitat and Distribution.—*Crataegus pinetorum* is found in woodland edges and gaps, from south-central Mississippi through Alabama to northern Georgia (Fig. 10). It appears to be scarce.

Comment.—I have been unable to locate Beadle's original material of this species, for which no Type was designated and which were from Marshall Co., Alabama. Nor were any specimens labeled '*pinetorum*' in Beadle's hand seen so the species, as understood here, while it does not disagree with the protologue, could be different from Beadle's intention and has therefore received an amplified description here. This is now one of the more distinct of the species in ser. *Pulcherrimae* and, at least superficially, appears most similar to *C. pulcherrima*. It differs from that species in its sharply, rather than obtusely, lobed leaves, often densely glandular petioles, exceptionally small leaf marginal teeth and red fruit. It also somewhat resembles the more deeply lobed forms of *C. gilva*. Our flowering material was collected after petal drop, consequently a few important characters are missing from the description.

6. Crataegus venusta Beadle, Bot. Gaz. 28:338. 1900. (**Figs. 11, 16**). TYPE: U.S.A. ALABAMA. Jefferson Co.: Birmingham, no date, but probably Sep or Oct 1900, *C.D. Beadle 2187/2* (LECTOTYPE selected here: US 969379), 20 Apr 1900, *C.D. Beadle 2187* (EPITYPE selected here: US 969378).

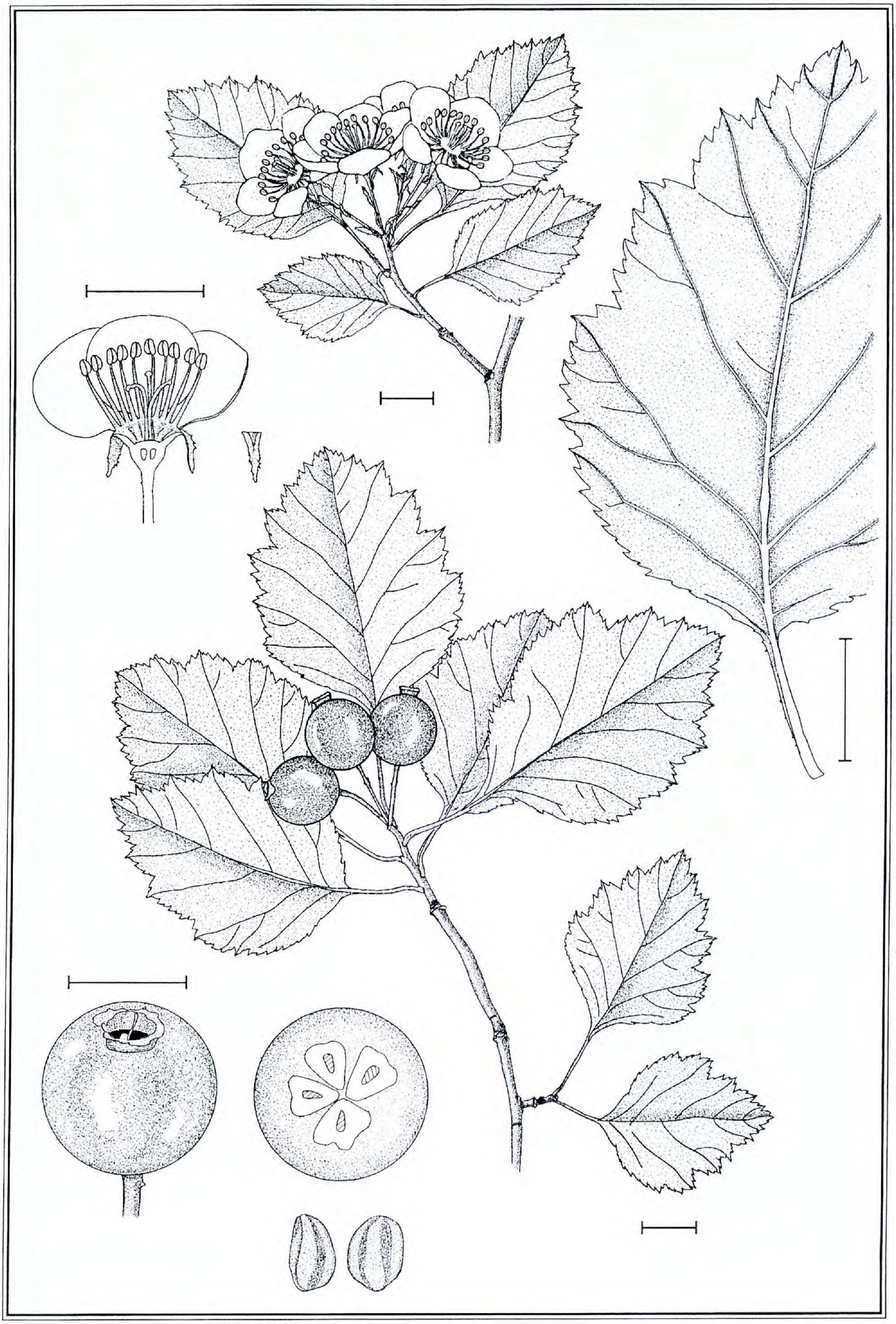

Fig. 11. Line drawing of *Crataegus venusta* from flowering specimen *Phipps & O'Kennon 7936* (UWO) and fruiting specimen *Phipps et al. 8050* (UWO). Scale bars = 1 cm. S. Laurie-Bourque del.

?=*Crataegus pallens* Beadle, Biltmore Bot. Stud. 1:28. 1901. TYPE: U.S.A. NORTH CAROLINA. Buncombe Co.: Biltmore, upland woods, 14 May 1900, *Biltmore Herb. BC2* (LECTOTYPE selected here: US 969397).

?=*Crataegus alma* Beadle, Biltmore Bot. Stud. 1:64. 1902. TYPE: U.S.A. MISSISSIPPI. Lauderdale Co.: Meridian, no date, fruiting specimen; *T.G. Harbison H5147* (LECTOTYPE selected here: US 969433).

Shrubs or small trees 4–7 m tall; one-year twigs often deep chestnut; thorns 2–5 cm long, usually slender, ± straight, very dark at 2-yr old. Leaves: petioles 25–30% length of blade, glabrous, very slender, with sparse sessile glands; blades 5–8 cm long at maturity, broad-oblong to ovate in general shape; base cuneate to broad-cuneate, apex acute to acuminate; shallowly lobed, 0–2 lobes per side, LII very shallow to max. ca. 25%, lobes acuminate young but much blunter in age lobes; margins with numerous, acute to acuminate teeth; venation craspedodromous, 5–7 main lateral veins per side; glabrous except for scattered long hairs adaxially along the mid-vein young. Inflorescences 5–8 flowered; branches glabrous, bearing numerous caducous, narrow-oblanceolate to linear, membranous, clear to greenish, densely gland-bordered bracteoles; anthesis early to mid April. Flowers 15–20 mm diam.; hypanthium ± glabrous; calyx lobes narrow-triangular, glabrous abaxially, finely gland-bordered; petals ± circular, white; stamens 20, anthers pink to purplish (or cream, Beadle); styles 3–4. Fruit 8–10 mm diam., suborbicular, greenish-yellow to yellow (or reddish, Beadle); calyx lobes spreading or erose; nutlets 3–5, dorsally sulcate, laterally smooth.

Habitat and Distribution.—Texas to Georgia, with one record for Tennessee, the second most northerly record for the series (Fig. 12). It is most abundant in Alabama. Brushy forest regrowth, forest gaps and margins.

Comment.—When flowering, *Crataegus venusta* is one of the most striking members of the series with typical oblong leaf blades, their ± lobeless margins bearing numerous acuminate teeth. At maturity this characteristic is diminished and typical larger short-shoot leaves then have several shallow lobes per side, these ± subacute. *Crataegus venusta* was described by Beadle as possessing reddish fruit and cream anthers, but all our material where color determination is possible has yellowish fruit and pink to purple anthers.

The most distinctive taxon attributed to possible synonymy with *C. venusta* is *C. pallens* (syn. *C. alma*), a morphotype with a very sparse and scattered distribution which is found from its type locality in western North Carolina to the type locality of its synonym *C. alma* in Mississippi. Compared to typical *C. venusta* it generally has slightly smaller leaves (blades typically less than 5 cm long), differently shaped lobes that are broader than those of *C. venusta* with leading edge usually ± perpendicular to the midvein and less sharp leaf teeth. If *C. pallens* were to be retained as an accepted species more convincing evidence would be required in view of its odd distribution. Nevertheless, indubitable intermediates with *C. venusta* are not known. For this reason it is listed separately in the appendix of cited specimens.

7. **Crataegus opima** Beadle, Biltmore Bot. Stud. 1:40. 1901. (**Fig. 13**). TYPE: U.S.A. ALABAMA. Butler Co.: Greenville, 2 Oct 1900, *C.D. Beadle 2159/2* (LECTOTYPE selected here: US 981036); *C.D. Beadle 2159*, fragment only (EPITYPE selected here: NY).

Crataegus abstrusa Beadle, Biltmore Bot. Stud. 1:68. 1902. TYPE: U.S.A. FLORIDA. Leon Co.: Tallahasee, 29 Aug. 1901, *T.G. Harbison H4958 = H4059/2* (LECTOTYPE selected here: US 969425).

?= *Crataegus contrita* Beadle, Biltmore Bot. Stud. 1:61. 1902. TYPE: U.S.A. FLORIDA. Gadsden Co.: River Junction, 3 Apr 1900, *C.D. Beadle 2078* (LECTOTYPE selected here: US 969333).

Crataegus illustris Beadle, Biltmore Bot. Stud. 1:68. 1902. TYPE: U.S.A. MISSISSIPPI. Lauderdale Co.: Meridian, - Sep 1901, *T.G. Harbison H5082 = 4200/2* (LECTOTYPE selected here: US 981041).

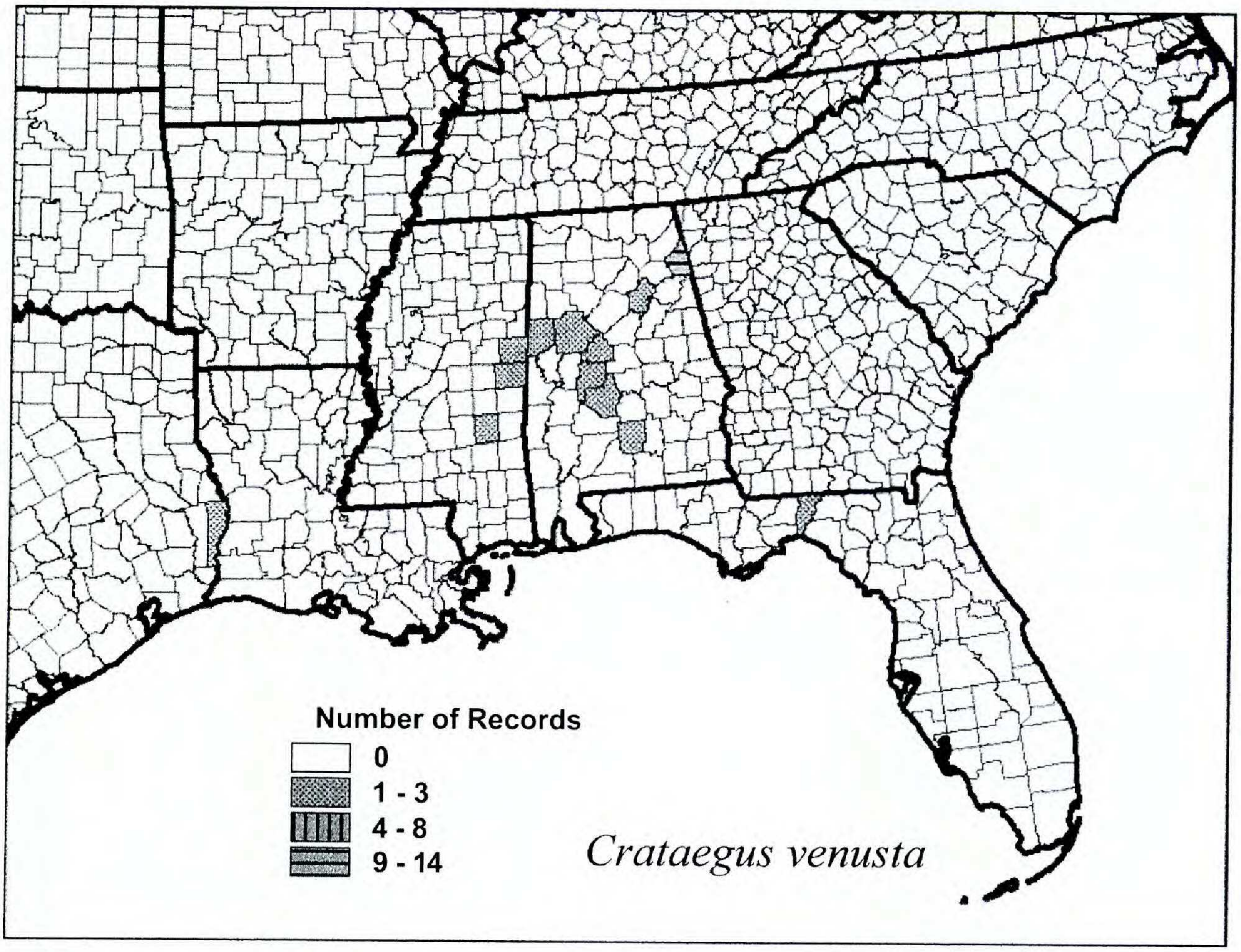

Fig. 12. County level distribution map of *Crataegus venusta* from collated records.

Crataegus inanis Beadle, Biltmore Bot. Stud. 1:62. 1902. Type: U.S.A., Alabama. Marshall Co.: near Albertville, 8 May 1901, *T.G. Harbison H4306* (lectotype selected here: US 969437).

?= *Crataegus lenis* Beadle, Biltmore Bot. Stud. 1:67. 1902. Type: U.S.A., Alabama. Butler Co.: Greenville, no date, fruiting specimen, *C.D. Beadle 2153/2* (lectotype selected here: US 969429).

Large shrubs or trees to 7 m tall; extending twigs glabrous, reddish-brown, at one year blackish-brown, older gray; thorns none to frequent, 2.5–4.0 cm long, slender, dark brown to blackish at 2-yr old. Leaves: petioles 20–30% length of blade, glabrous, with sparse short-stipitate glands; blades 3–5 cm long, mainly broad-ovate to somewhat deltate in general shape; base cuneate to broad-cuneate, apex subacute to obtuse; 3–4 main lobes per side, the lobes usually ± blunt, very shallow to max. LII ca. 20%; margins with small subacute teeth; venation craspedodromous, with 4–5 main lateral veins per side; sparsely pilose on the mid-vein above when young, glabrous below. Inflorescences 4–7 flowered; branches glabrous or sparsely pilose, bearing caducous, narrow-oblong (sometimes curved), membranous to green, gland-bordered bracteoles; anthesis early to mid April. Flowers 16–18 mm diam.; hypanthium ± glabrous; calyx lobes 4 mm long, triangular, glandular-serrate at the tip; petals ± circular, white; stamens 20, anthers cream to pale or deep purple; styles 3–5. Fruit 7–12 mm long, ± orbicular, yellow or red; calyx lobes erose, or reflexed, sitting on a slight collar; nutlets 3–5, dorsally sulcate, laterally smooth.

Habitat and Distribution.—Extreme southeastern Texas to Georgia, with over half the records from Alabama (Fig. 14), this is the most abundant member of the series. It is found in open woods and woodland margins. Figure 14 maps *C. opima* and *C.* cf. *opima* (sp. 7a) as one.

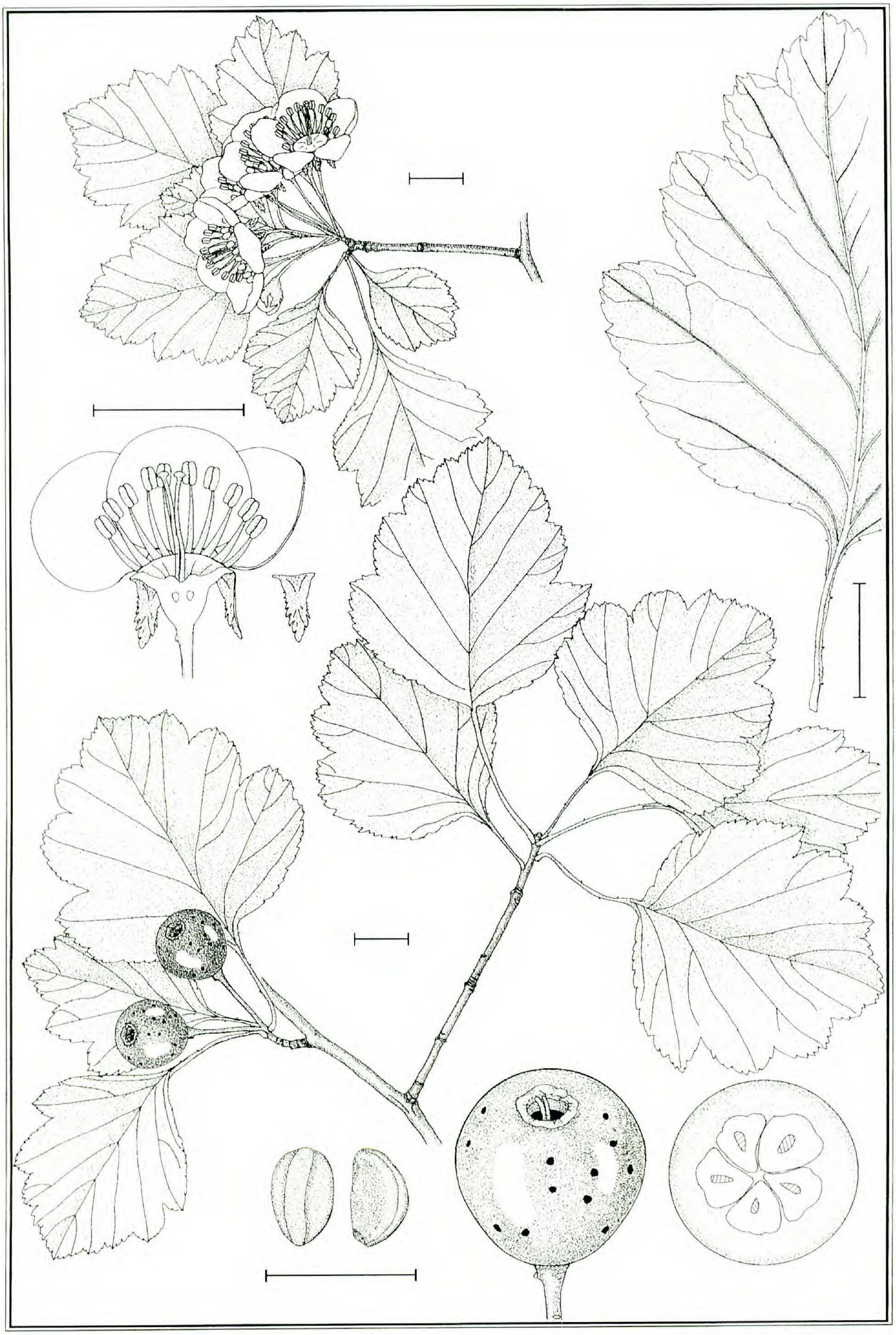

Fig. 13. Line drawing of *Crataegus opima* from flowering specimen *Godfrey 80540* (UWO), fruiting specimen *Phipps & O'Kennon 8089* (UWO) and sterile specimen *Phipps & O'Kennon 8099* (UWO). Scale bars = 1 cm. S. Laurie-Bourque del.

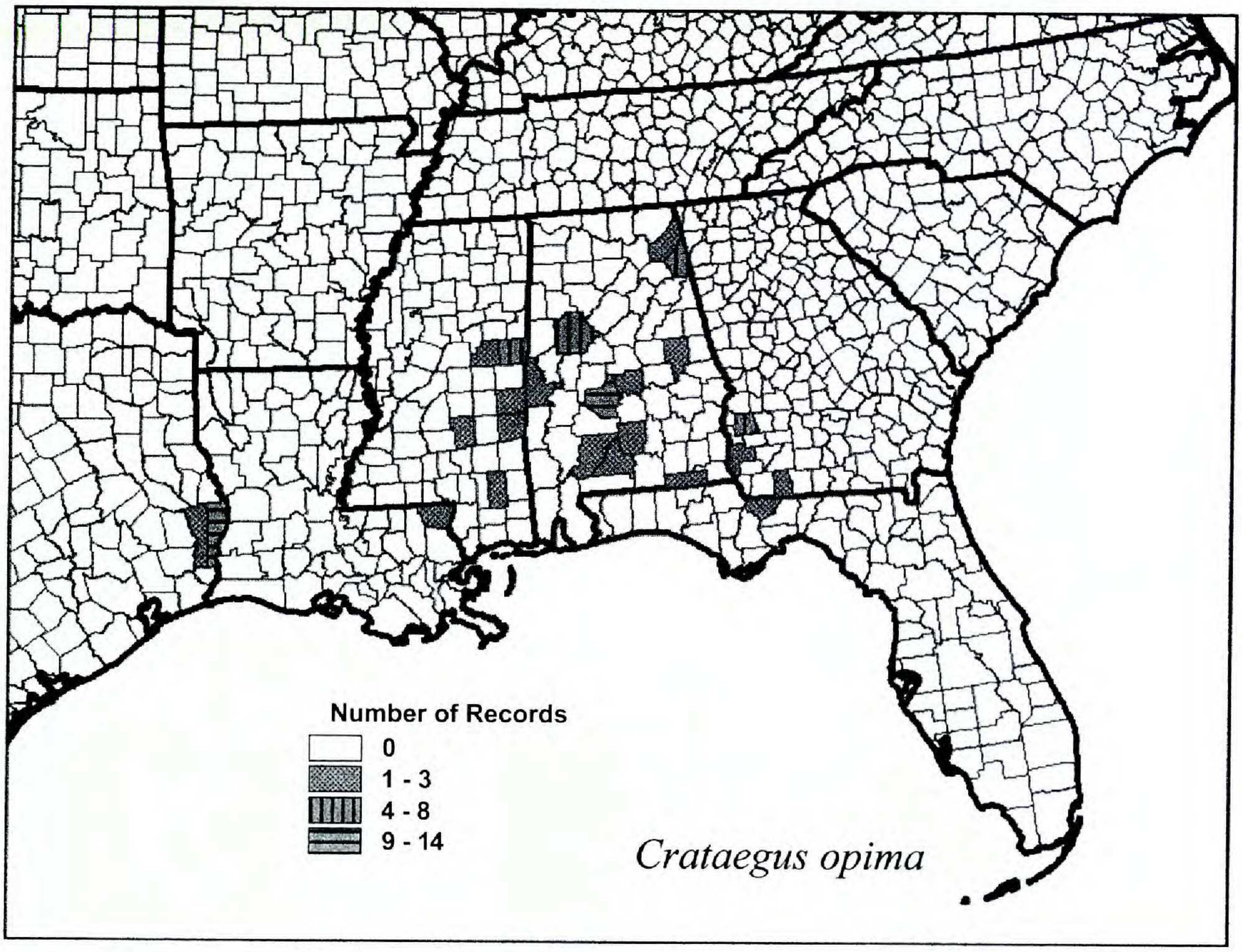

Fig. 14. County level distribution map of *Crataegus opima* and *C.* cf. *opima* combined from collated records.

Comment.—The species as defined here comprises all the smaller leaved members of the series with broadly proportioned leaves and ± blunt lobing. These tend to have few and fairly shallow lobes. Both red and yellow-fruited forms are known as are forms with cream or purple anthers. It is possible that, as elsewhere in the series, these forms should be recognized as distinct taxa, but more detailed study would be required to authenticate this.

7a. Crataegus cf. **opima** Beadle (**Fig. 15**).

Assigned here are all *opima* like individuals with ovate to ovate-trullate leaves, 5–7(–8) lateral veins per side and 5–8 usually short lobes per side with leaves 5–8 cm long. Forms with these larger multiveined leaves may also have acute lobes. More material and further study is required to see whether this should be recognized as a distinct species.

Note that Figure 14 maps this species and the previous as one and that the list of cited specimens (see Appendix) lists only those specimens of this species which are at UWO. All these are from Alabama and Missisippi but this entity is undoubtedly much more numerous and widespread than this would indicate.

8. Crataegus tecta Beadle, Biltmore Bot. Stud. 1:26. 1901. (**Fig. 16**). Type: U.S.A. Alabama. Marshall Co.: near Albertville, 7 May 1900, *T. G. Harbison 2205* (lectotype selected here: US 969434). The flowering fragment of *Harbison 2205* at NY displays well the characteristic lobing of the species. However, the fruiting co-type at US (*T.G. Harbison 3285*) appears to be *C. venusta* as does the fruiting specimen at NY.

?-*Crataegus austrina* Beadle, Biltmore Bot. Stud. 1:59. 1902. Type: U.S.A. Alabama. Butler Co.: Greenville, no date, fruiting *C.D. Beadle 2151* (lectotype selected here: US 969395).

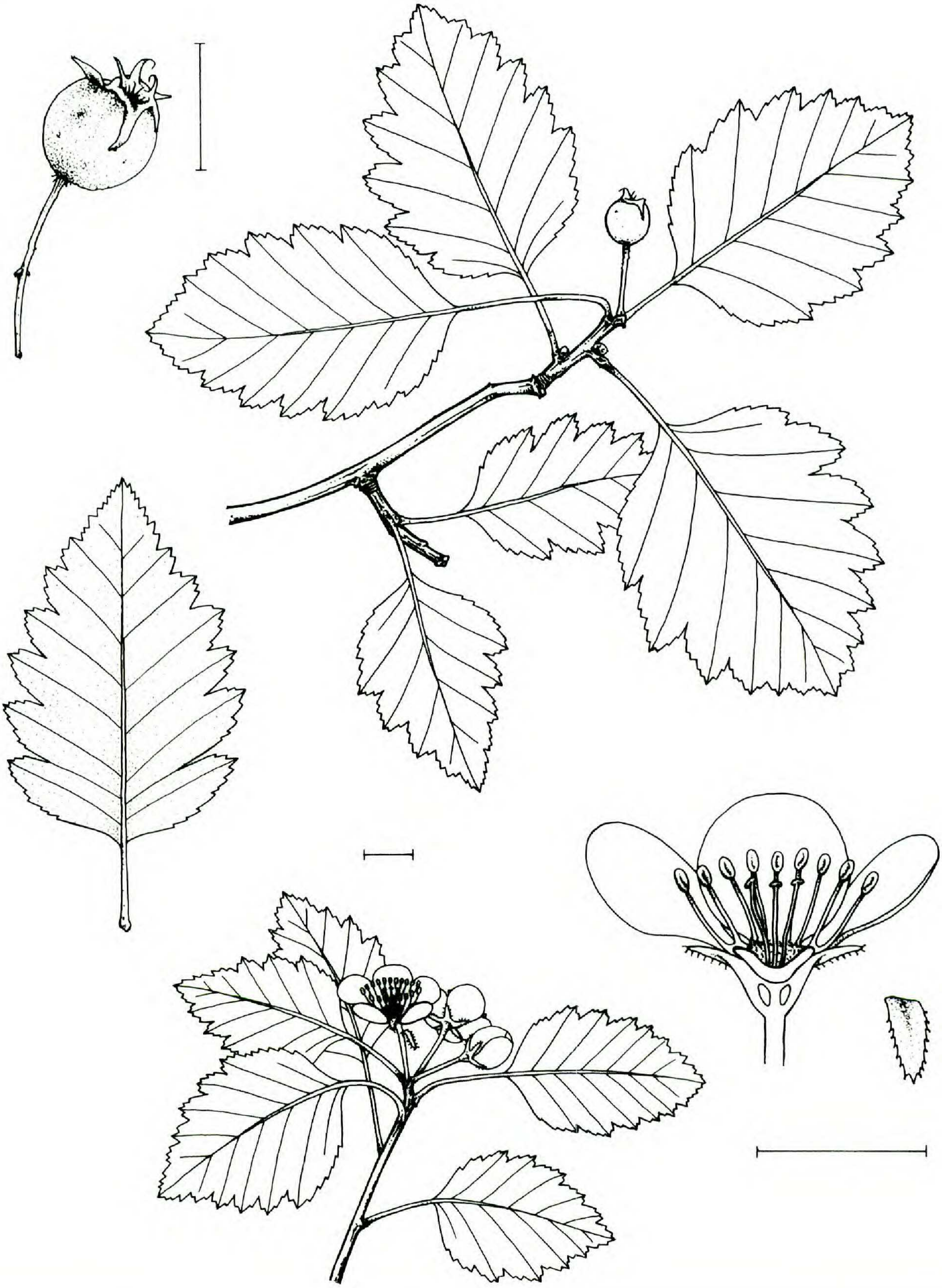

Fig. 15. Line drawing of *Crataegus* cf. *opima* from flowering specimen *Phipps 7930* (UWO), fruiting specimen *O'Kennon 14457* (UWO) and leaf from *Phipps 7795* (UWO). Scale bars = 1 cm. R. Bremmer del.

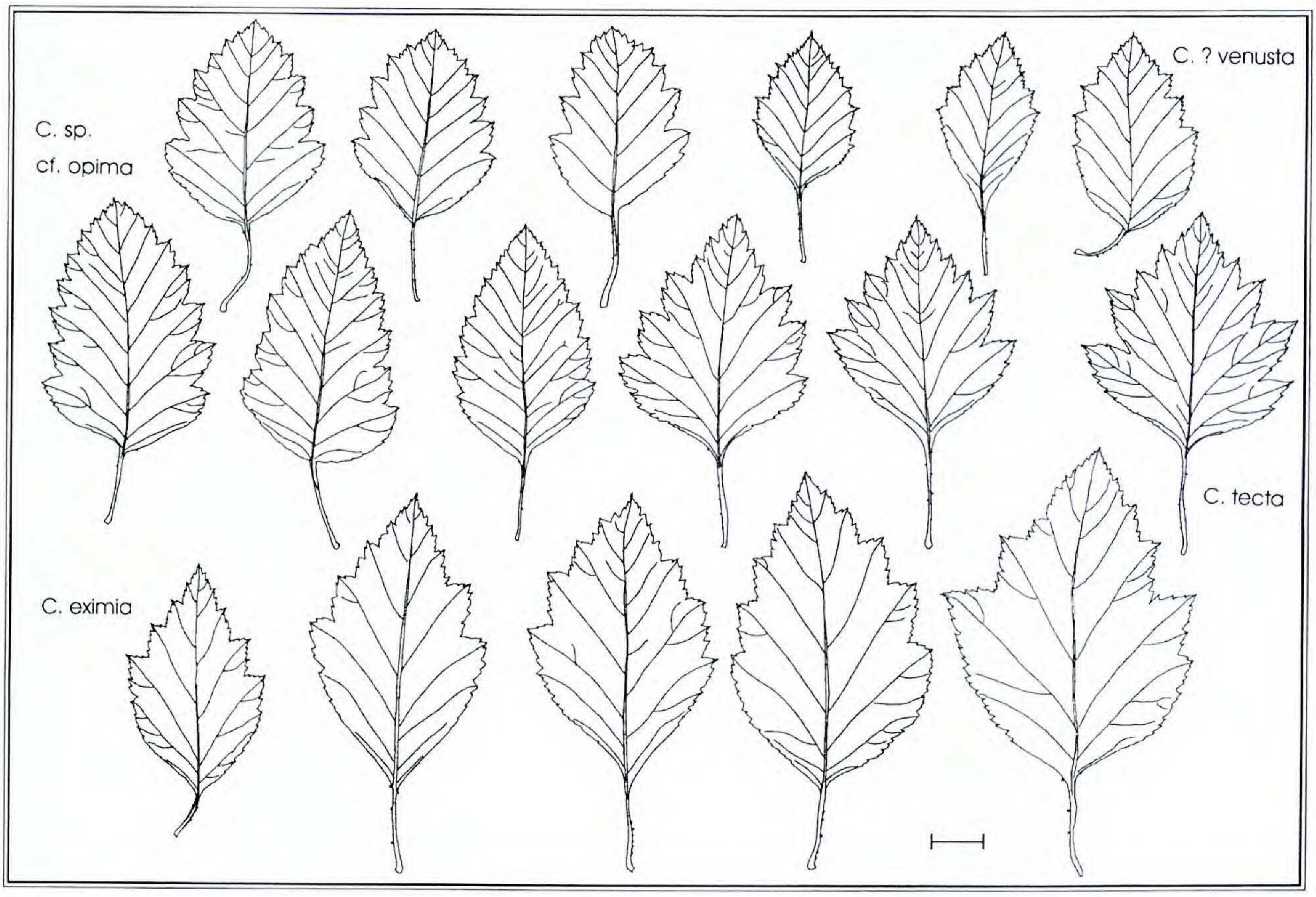

Fig. 16. Line drawing of leaf spectra of: ***Crataegus*** **cf.** ***opima*** **from** ***Cooley et al. 3174*** **(UWO)—top row, left three;** ***C.*** **cf.** ***opima*** **from** ***Phipps & O'Kennon 8069*** **(UWO)—middle row, left three;** ***C. ?venusta*** **from** ***Ulf Hansen 029*** **(UWO)—top row, right three;** ***C. tecta*** **from** ***Harbison 2205*** **(US)—middle row, right three;** ***C. eximia*** **from** ***Harbison H4481*** **(A)—bottom row, all. Scale bars = 1 cm. S. Laurie- Bourque del.**

?=*Crataegus ancisa* Beadle, Biltmore Bot. Stud. 1:63. 1902. TYPE: U.S.A. MISSISSIPPI: Lauderdale Co.: Meridian, 16 Sep 1901, *T.G. Harbison H5092* (LECTOTYPE selected here: US 969424).

Crataegus macilenta Beadle, Biltmore Bot. Stud. 1:64. 1902. TYPE: U.S.A. ALABAMA. Marshall Co.: Albertville, 7 Oct 1901, *T.G. Harbison H5203- H4283/2* (lectotype selected here: US 969432).

Shrubs or small trees 4–6 m tall; bark of trunk not recorded; extending shoots glabrous, at 1-yr dark shiny reddish-black, older dull gray; thorns 2.5–4 cm long, ± straight, ± fine, at 2 yr shiny reddish-black. Leaves: petioles 30–50% length of blade, glabrous, channeled above, with a few sessile glands; blades 3–6 cm long, trullate to rhombovate or ovate in general shape, some times broadly so; apex subacute, base wide cuneate to cuneate; usually fairly deeply (max. LII 20–50%) 3–4 lobed per side, the lobes acute or acuminate to somewhat cuspidate, the larger sharper; margins with small acuminate teeth except at the base; venation craspedodromous, with 4–5 main lateral veins per side; glabrous above except along the main veins when young, glabrous below. Inflorescences 3–6 flowered; branches normally glabrous, beset with numerous caducous, sublinear and often wider near the apex, sometimes curved, membranous to ± herbaceous, gland-margined bracteoles. Flowers 17–19 mm wide; hypanthium externally glabrous; calyx lobes ca. 7 mm long, narrow-triangular, subentire or with margins glandular-denticulate; petals ± circular, white; stamens 20, anthers pale pink to purple or occasionally ivory to cream (see discussion); styles 3–5. Fruit ca. 7 mm long, ± globose, red or green to yellow at maturity (see discussion); calyx lobes reflexed; nutlets 3–5, dorsally grooved, laterally smooth.

Habitat and Distribution.—*Crataegus tecta* occurs from Mississippi to western Georgia, with several records for northern Florida (Fig. 17). It is fairly common in southern Alabama and is found in woodland gaps and edges, and brushy places.

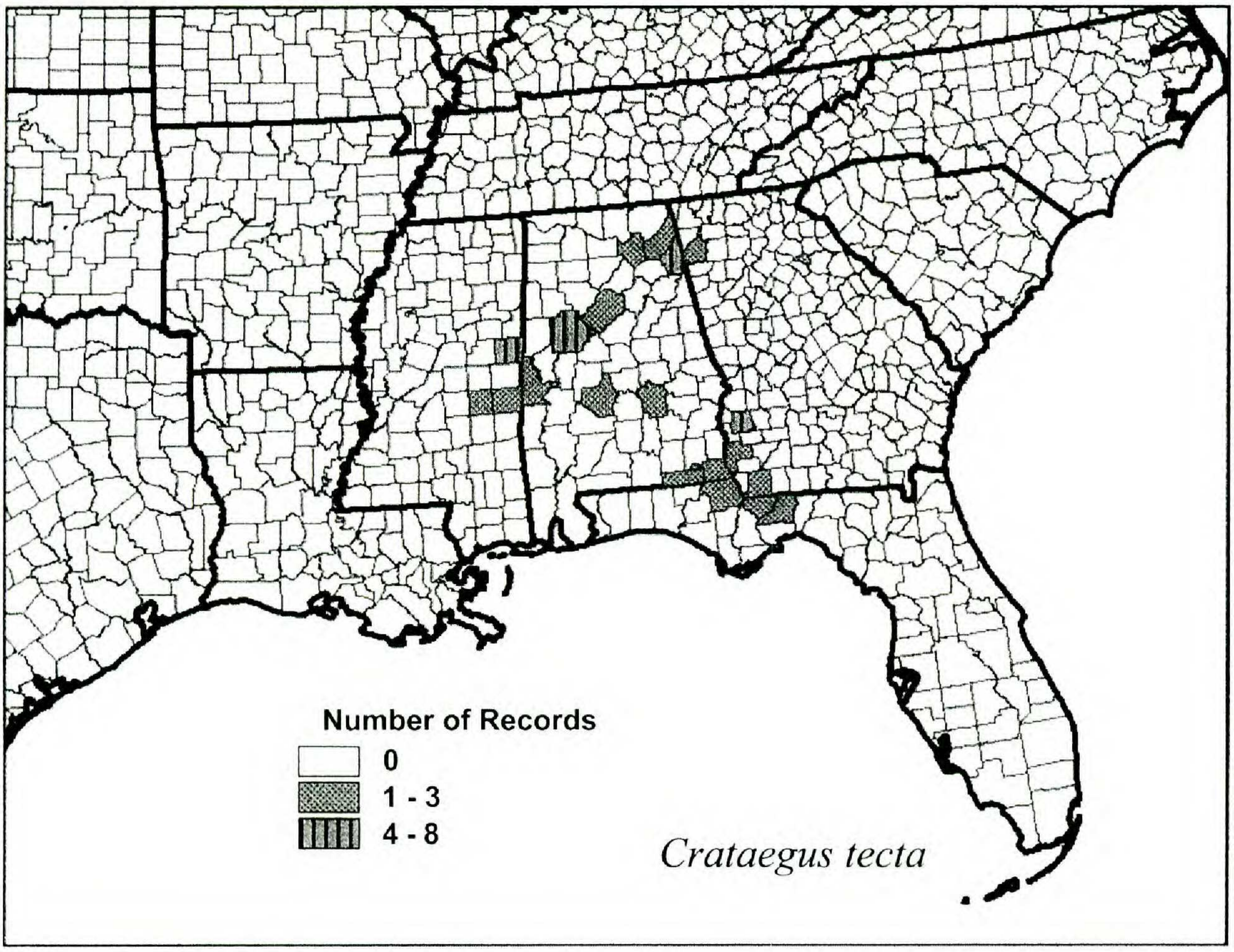

Fig. 17. County level distribution map of *Crataegus tecta* from collated records.

Comment.—The type material of *C. tecta* is of the form represented by the right hand three leaves in the middle row of our figure. This is a very distinctive morphotype in series *Pulcherrimae*. One specimen of *C. tecta* has a fairly densely pubescent inflorescence. If correctly idetified, this is the only such example for the series. *Crataegus ancisa* and *C. macilenta* are both recorded by Beadle as having red fruit and pink to purple anthers but do not differ in other respects. *Crataegus tecta* is most like *C. opima* but with deeper and sharper lobes. Compared to *C. incilis* the latter species the leaves are proportionately narrower, have more lateral veins and the anthers not cream or ivory. Some specimens with deepish lobing, conspicuously acuminate and slightly reflexed lobes are provisionally referred here rather than to *C. venusta*. *Crataegus opima* is the most generally similar species to *C. tecta*, lobe size and shape being the main discriminators. The dubious attribution of *C. austrina* as a synonym is because the lectotype is quite like 7a, *C.* sp. cf .*opima* and the flowering co-type is rather like *C. pallens*. In the case of the *C. ancisa* lectotype, this is one of the few unequivocally intermediate specimens encountered, and it is between *C. opima* and *C. tecta*.

9. Crataegus incilis Beadle, Biltmore Bot. Stud. 1:41. 1901. (**Fig. 18**). Type: U.S.A. Alabama. Autauga Co.: Evergreen, 12 Apr 1900, *C.D. Beadle 2143* (lectotype selected here: US 969493).

Crataegus concinna Beadle, Biltmore Bot. Stud. 1:70. 1902. Type: U.S.A. Florida. Liberty Co.: Bristol, 2 Apr 1901, *T.G. Harbison H4040* (lectotype selected here: US 981039).

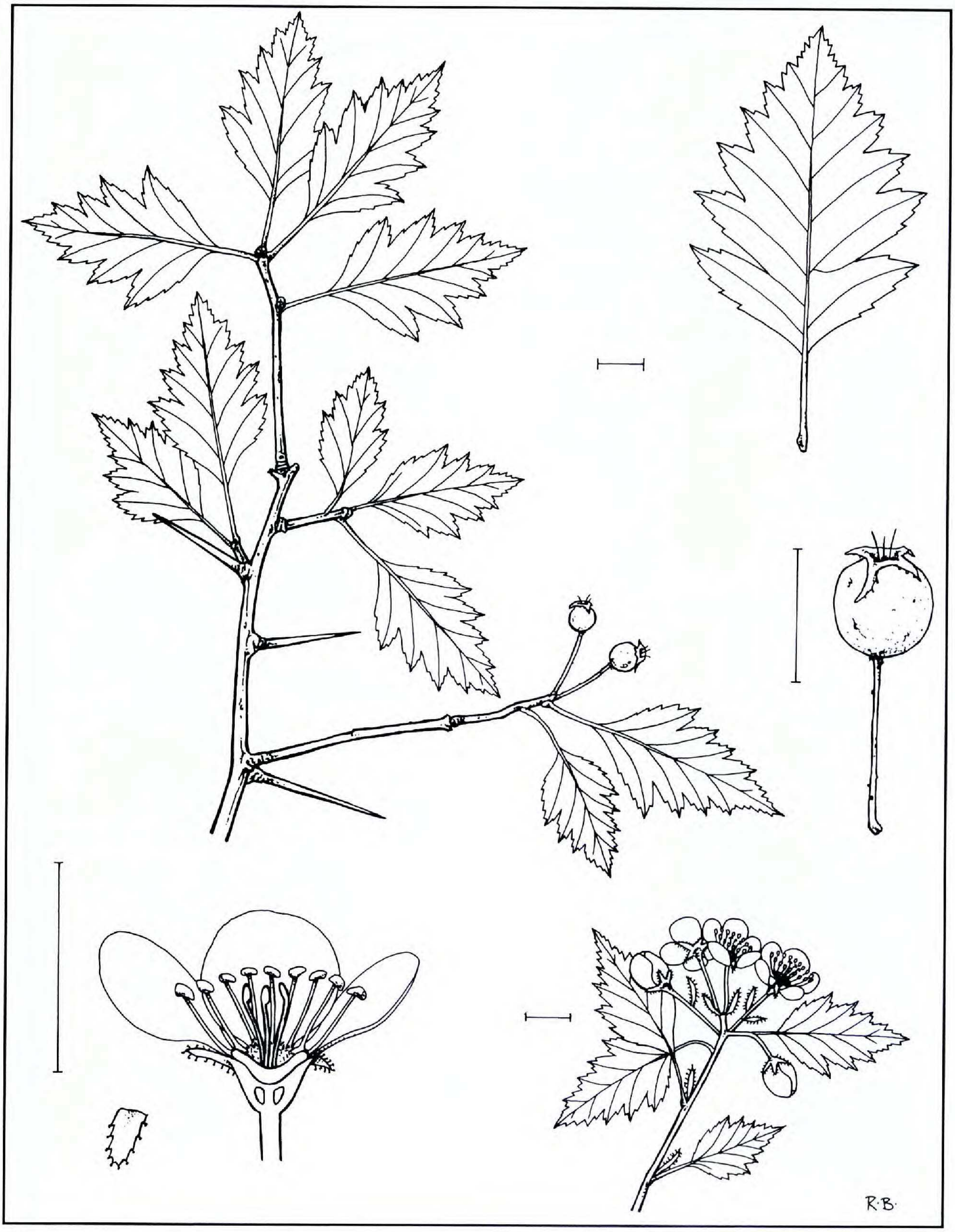

Fig. 18. Line drawing of *C. incilis* from flowering specimen *Phipps 7891* (UWO), fruiting specimen *Phipps 8039* (UWO) and single leaf *Phipps 7844* (UWO). Scale bars = 1 cm. R. Bremmer del.

Shrubs or small trees 4–7 m tall; 1-yr old twigs dark red brown, at 2 yr dark gray; thorns 1.5–3 cm long. Leaves: petioles 1.5–2.5 cm long, slender, glabrous, with few to several sessile glands; blades 3.5–5.5(–7.5) cm long, trullate to narrow-ovate in general outline; subacute at tip, base cuneate, then tapering into the upper winged part of the petiole; 3–4 lobes per side with max. LII 15–40%, lobes usually ± narrow-cuspidate; margins with small somewhat distant subacute teeth; venation craspedodromous, with about 5–7 pairs of lateral veins/side; glabrous on both sides at maturity. Inflorescences 3–7 flowered; branches glabrous; bracteoles abundant, caducous, linear, membranous, gland-margined. Flowers 14–18 mm diam.; hypanthium glabrous; calyx lobes ca. 7 mm long, narrow triangular, margins subentire to glandular-denticulate; petals white, ± circular; stamens 20, anthers pink; styles 3–5. Fruit 5–8(–10) mm diam., globose, red or yellow; calyx lobes wide-spreading; nutlets 3–5, dorsally grooved, laterally smooth.

Habitat and Distribution.—Most of our records are from northeastern Alabama, but it is known from Mississippi to southwestern Georgia and northwestern Florida (Fig. 19). *Crataegus incilis* is found in open woods and woodland margins.

Comment.—The deeply cut trullate leaves, with the acute tips of their triangular lobes in a ± straight line in the more extreme forms, as in our illustration, are very distinctive. The Type, and most specimens seen, however, do not have quite such nearly straight-sided lobes as seen in the illustration and their lobes may be described as ± narrow cuspidate. Forms with somewhat more rounded lobes and yellow fruit are perhaps represented by *C. concinna*. However, it should be noted that the fruiting co-types of *C. concinna* at US (both *H4040/2*) appear to be a different species, one with barely lobed leaves. The delicate leaves and twigs of this species are peculiarly attractive.

10. Crataegus eximia Beadle, Biltmore Bot. Stud. 1:62. 1902. (**Fig. 16**). TYPE: U.S.A. ALABAMA. Jackson Co.: Sand Mountain, near Pisgah, 6 May 1900, *T.G. Harbison 4448* (LECTOTYPE selected here: A).

Shrubs or small trees 3–4 m tall; 1-year old twigs reddish-brown; older gray; thorns 3–4 cm long, usually fine, slightly curved, at 2 yrs. blackish-gray. Leaves: petiole 25–40% length of blade, glabrous, adaxially grooved, densely beset with stipitate glands, at lest young; blades mainly 4.5–6.5 cm long at anthesis, to 8 cm at maturity, ovate-rhombic to ovate-trullate; 3–4(–5) lobes per side, these subacute to acute, max LII usually 20–33%; margins finely dentate; venation craspedodromous, 5–6 main lateral veins per side; abaxial surface scabrous-hairy only along main veins when young, glabrous below. Inflorescences 4–6 flowered; branches glabrous, bearing caducous, very narrowly obovate, ± membranous, gland-margined bracteoles. Flowers 22–25 mm diam.; hypanthium glabrous; calyx lobes 4–5 mm long, finely glandular-serrate, glabrous on both sides; petals ± circular, white; stamens ca. 20, anthers cream; styles 3–4. Fruit (Beadle) 8–12 mm wide, globose, at maturity reddish; nutlets 3–5 (Beadle), dorsally grooved.

Habitat and Distribution.—Rocky woods and glades, Sand Mountain, Jackson Co., Alabama (Fig. 20).

Comment.—Known to me (JBP) only from a flowering co-type, this nevertheless seems one of the most distinct entities in the series on the basis of its large rhombovate leave with deep and angular lobing, large flowers and late to very late flowering date (23 May in 1901). Series *Pulcherrimae* are generally scarce this far north.

APPENDIX

Further cited specimens (species, states and counties arrangement alphabetic).

Crataegus gilva Beadle

ALABAMA. Cherokee Co.: Little R. Canyon North Park, 24 Apr 1969, *K.E. Landen & J. Cofield s.n.* (JSU); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7937a* (UWO); entrance road to Little River Canyon Mouth Park, 33° 17'N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7922* (UWO); entrance road to Little River Canyon Mouth Park, 34° 17'N, 88° 40.5'W; 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7923* (UWO); Little River Canyon rim road ca. 1 km direct NW from Daniel's Gap, 34° 18'N,

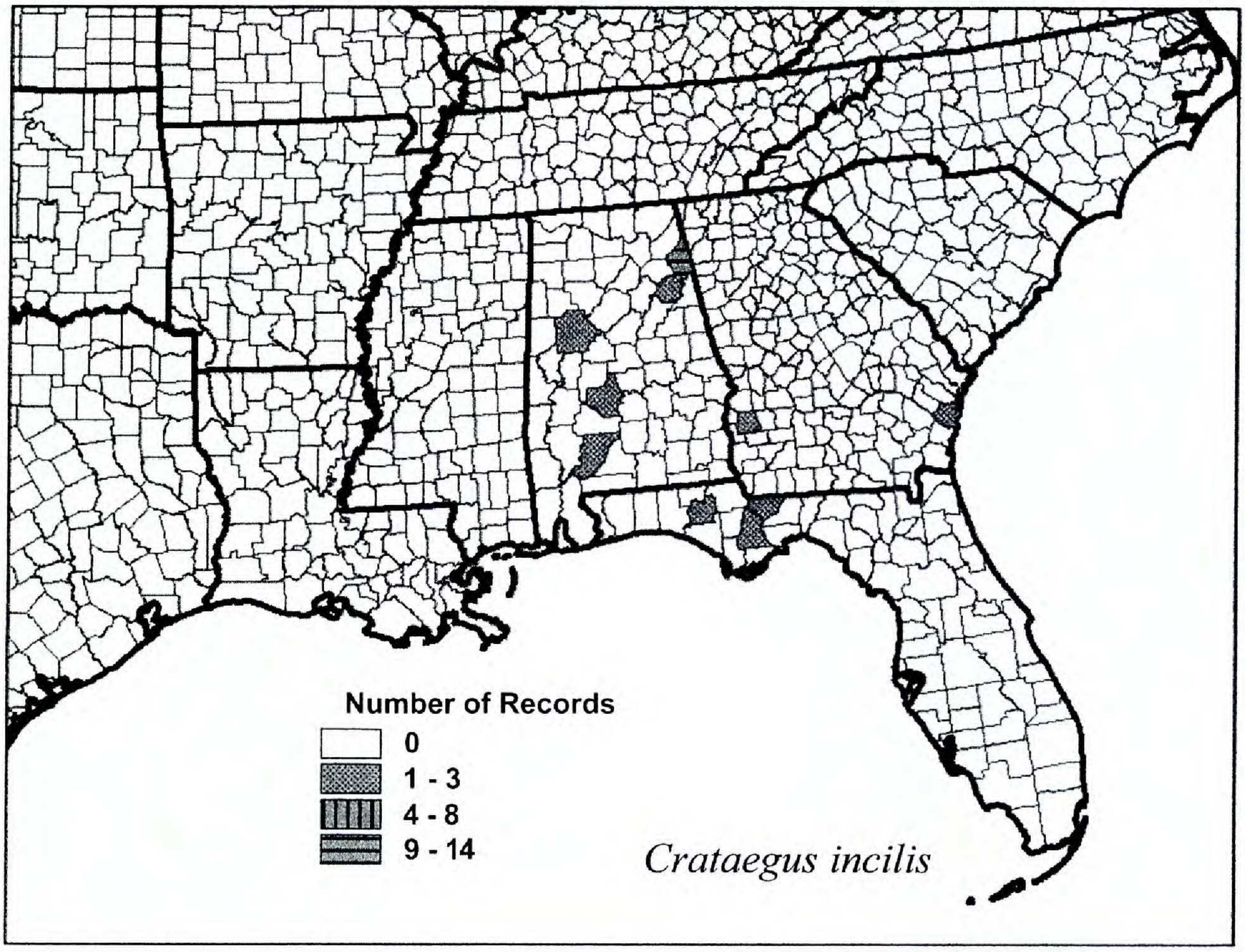

Fig. 19. County level distribution map of *Crataegus incilis* from collated records.

85° 42'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8046* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7940* (UWO). **De Kalb Co.:** Along Little R. in Little R. Canyon, near Eberhart's Point; 20 Apr 1968, *K.E. Landen & J. Cofield s.n.* (JSU); De Soto State Park, campground area, 34° 30'N, 85° 38'W, 19 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7956* (UWO); De Soto State Park, campground area, 34° 30'N, 85° 38'W, 19 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7954* (UWO). **Marshall Co.:** no location, no date, *C.D. Beadle s.n.* (A). **Tallapoosa Co.:** Along Co. Road 2, on hilltop S of Romulus, scrubland on W side of road, 10 Apr 1999, *R. Lance s.n.* (UWO); Co. Rd. 2, 10 km NE of jct. 10 or 51, SE side at gate with big overview opposite, 33° 13'N, 87° 42'W, 13 Apr 1999, *J.B. Phipps 7889* (UWO). **Tuscaloosa Co.:** near Northport Econolodge, wooded bank behind motel, at edge, 33° 14'N, 87° 34'W, 11 Apr 2000, *J.B. Phipps 8118* (UWO).

FLORIDA. Gadsden Co.: Aspalaga, Appalachicola R., 05 Apr 1964, *S. McDaniel 4095* (IBE); Greensboro, 05 Apr 1964, *D. Demaree 49482* (NO). **Jackson Co.:** Three Rivers State Park, road leading to camping area no. 1, 1 mi N of Sneads, 03 June1983, *R.K. Godfrey 80684* (UWO). **Leon Co.:** near Tallahassee, Apr 1843, *Rugel 44* (BM, NY); mesic woodland on bluff by Lake Miccosukee, Ring Oak Plantation, E of Miccosukee, 22 Mar 1983, *R.K. Godfrey 80354* (UWO). **Liberty Co.:** Bristol, Appalachicola R., 24 Mar 1967, *S. McDaniel 8625* (IBE).

GEORGIA. Burke Co.: Rte 56, N of intersection with 80, N of Lake Crystal Rd. to E, 33° 05'N, 82° 05'W, 09 Apr 1991, *J.B. Phipps 6498* (UWO). **Clarke Co.:** Athens, Ag. Campus, Oconee Hillside, 11 Apr 1929, *J.R. Dunnaway E8027* (GA, 2). **Houston Co.:** Oakey Woods Wildlife Management Area, just S of Kathleen, E side of gravel road to check-in station, 0.4 mi S of fork, 32° 28.680'N, 83° 34.667'W, 10 Apr 2001, *R. Lance 2130* (UWO). **Merriwether Co.:** White Sulphur Springs, 26 May 1924, *T.G. Harbison 16307* (UNC). **Rabun Co.:** Tallulah River State Park, near overlook to dam, NE of dam, N 34° 44.429', W 83° 23.655', 26 Apr 2001, *R. Lance 2135* (UWO). **Randolph Co.:** SE of Coleman, ca. 0.5 mi W of Co. Rd. 160, on N side of Co. Rd. 62, across from old drive, 31° 28.630'N, 84° 52.875'W, 09 Apr 2001, *R. Lance 2112* (UWO); SE of Coleman, 0.5 mi W of jct. with Hwy 160 on S side of road, at woods and field corner, near phone box "616-6," 31° 39.898'N, 84° 53.642'W, 10 Apr 2001, *R. Lance 2120* (UWO). **Richmond Co.:** Augusta, sand hills, 20 Apr 1900, *S.T. Olney and J. Metcalf 222* (DOV); Augusta, no date, *A. Cuthbert 2* (GH).

MISSISSIPPI. Greene Co.: roadside in wooded country near McLain on US 98, 31° 07'N, 88° 48'W, 07 Apr

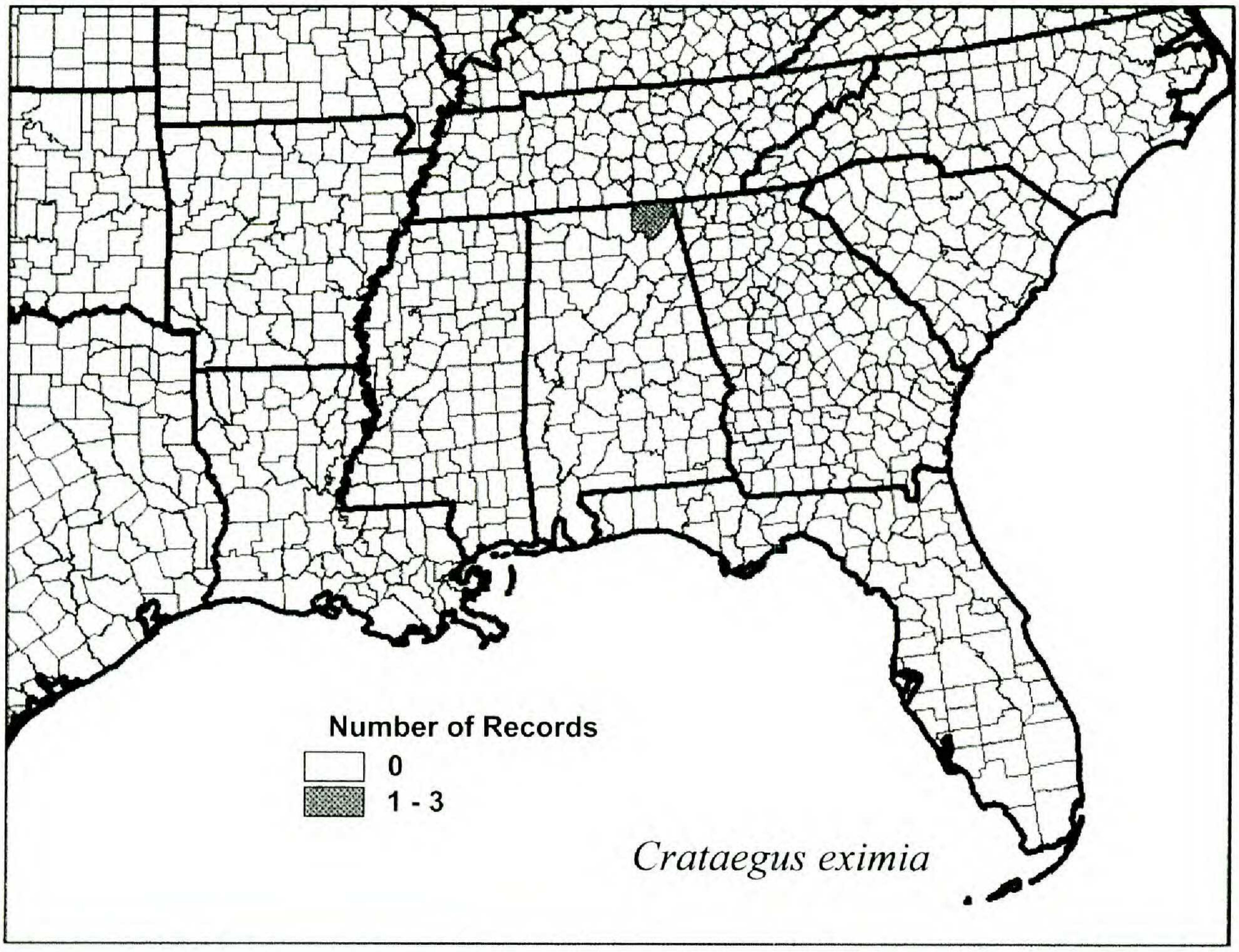

Fig. 20. County level distribution map of *Crataegus eximia* from collated records.

1984, *J.B. Phipps & T.C. Wells 5335* (UWO); roadside in wooded country near McLain on US 98, 31° 07'N, 88° 48'W, 07 Apr 1984, *J.B. Phipps & T.C. Wells 5339* (UWO). **Jones Co.:** Laurel, just N of jct. Tallahoma/Tallahala Creeks, NW4 S35, 02 Apr 1980, *S. McDaniel s.n.* (UNA, UWO). **Lauderdale Co.:** Meridian, 12 Apr 1900, *C.S. Sargent s.n.* (DOV). **Simpson Co.:** Saratoga, 01 Apr 1903, *S.M. Tracy 8490* (MO).

Crataegus incilis Beadle

ALABAMA. Calhoun Co.: Brown Ridge Road, 0.3 mi SW of jct. with county highway 55, scrubby hill E side of Brown Ridge Road, opposite open field, 08 Apr 1998, *R. Lance s.n.* (UWO). **Cherokee Co.:** Little River Canyon rimroad, ca. 1 mi NW of Daniel's Gap, 34° 17'N, 85° 41'W, 08 Oct 1998, *J.B. Phipps 7844a* (UWO); Little River Canyon rimroad, ca. 1 mi NW of Daniel's Gap, 34° 17'N, 85° 41'W, 08 Oct 1998, *J.B. Phipps 7844c* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7939* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 22 1999, *J.B. Phipps & R.J. O'Kennon 8040* (UWO); entrance road to Little River Canyon Mouth Park, 34° 17'N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7946* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8048* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 22 Apr 1999, *J.B. Phipps & R.J. O'Kennon 8039* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7942* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8045* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7944* (UWO); entrance road to Little River Canyon Mouth Park, 34° 17'N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7924* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8042* (UWO). **Dallas Co.:** road to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville, 32° 11'N, 87° 05'W, 24 Apr 1999, *R.J. O'Kennon & R. Lance 14458* (UWO); Elm Bluff, near Alabama River, 32° 11'N, 87° 06'W, 02 Oct 1998, *J.B. Phipps & R. Lance 7795* (UWO). **Monroe Co.:** Haines Island, high limestone ridges along Alabama R., Red Hills area, 05 Apr 1986, *A.R.*

Diamond 2256 (AUA). **Tuscaloosa Co.:** Lake Lurleen State Park, wooded slope near campground, 10 Apr 1999, *R. Lance 66* (UWO).

FLORIDA. Gadsden Co.: Hardin Heights, jct. FL 269 and E extension of Brickyard Rd., 03 Aug 1983, *J.B. Nelson & G.R. Knight 2449* (FSU). **Liberty Co.:** Bristol, 31 Mar 1902, *T.G. Harbison H4040* (A). **Washington Co.:** FL 273, 8 mi S of Chipley, 14 Apr 1966, *J. Beckner & W. D'Arcy 1160* (DUKE).

GEORGIA. Mcintosh Co.: Meridian, 19 Apr 1912, *T.G. Harbison 10859* (NCU).

Randolph Co.: SE of Coleman, ca. 0.5 mi W of Co. Rd. 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 09 Apr 2001, *R. Lance 2111* (UWO); SE of Coleman, ca. 6.7 mi from S end of Rd. 20 and 1.1 mi from jct. with Hwy 160, ca. 20 ft W of road, in young oak woodland, just W of cemetery and telephone cable post "616-12," N 31° 39.708' W 84° 54.131', 09 Apr 2001, *R. Lance 2119* (UWO).

MISSISSIPPI. Smith Co.: SE of Lemon on 35, SR 533A, 32° 07'N, 89° 29'W, 26 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8090* (UWO).

Crataegus mendosa Beadle

ALABAMA. Cherokee Co.: Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34°18'N 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7941* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7938* (UWO); Little River Canyon Park, just N of Powell Trail access on rim road, 34° 19.729'N 85° 40.232'W, 25 Sep 2001, *R. Lance 2176* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7939a* (UWO). **Choctaw Co.:** AL 10, 9 km SE of jct. Co. Rd. 9 (at Lisman), SW side of road, 32° 06'N 88° 15'W, 14 Apr 1999, *J.B. Phipps 7904* (UWO). **Dallas Co.:** road to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville, 32° 11'N 87° 05'W, 24 Sep 1999, *R.J. O'Kennon & R. Lance 14455* (UWO); road to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville, 32° 11'N 87° 05'W, 24 Sep 1999, *R.J. O'Kennon & R. Lance 14454* (UWO). **Madison Co.:** Pine Bluff (1315 ft), 10 Apr 1882, *C. Mohr 446* (ALU). **Pickens Co.:** On dirt road joining Fellowship and New Hope churches, 2.2 mi N of Co. Road 30, NW 1/4 Sec 24 T19S R14W, 09 Apr 1977, *L.J. Davenport 22* (UNA). **Tallapoosa Co.:** Approx. 15 mi from Dadeville post office, SSW, 4 mi from Martin Dam, 01 May 1971, *E.J. Widder 096* (AUA); Route 50 ca. 1 km E of Martin Dam, 32° 41'N 85° 53'W, 16 Oct 1984, *J.B. Phipps 5500* (UWO). **Tuscaloosa Co.:** Co. Rd. 2, 5 km NE of jct. 10 or 51, 33° 12'N 87° 43'W, 13 Apr 1999, *J.B. Phipps 7886* (UWO); Co. Rd. 2 at 11 km NE jct. 51 at overlook, 33° 13'N 87° 42'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8068* (UWO); Co .Rd. 2 at 11 km NE jct. 51 at overlook, 33° 13'N 87° 42'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8070* (UWO); Co. Rd. 2 at 11 km NE jct. 51 at overlook, 33° 13'N 87° 42'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8065* (UWO); Co. Rd. 2, 10 km NE of jct. 10 or 51, 33° 13'N 87° 42'W, 13 Apr 1999, *J.B. Phipps 7892* (UWO); Kellytown Rd., 1 km from jct. Valley Rd., 33° 07'N 87° 49'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon* 8073 (UWO).

FLORIDA. Gadsden Co.: River Jct., 06 Sep 1940, *W.A. Murrill 20* (MO). **Jackson Co.:** ca. 9 mi N of Marianna, 21 Oct 1955, *R.K. Godfrey & H. Kurz 54277* (NCSC). **Leon Co.:** 4 mi E of Tallahassee (decid. woods), 16 Mar 1955, *R.K. Godfrey 53022* (USF). **Wakulla Co.:** near Wakulla Springs, 12 Apr 1931, *E.J. Palmer 38571* (MO).

GEORGIA. Randolph Co.: SE of Coleman, ca. 0.5 mi W of Co. Rd 160, on N side of Co. Rd. 62 on margin of private drive, N 31° 28.630', W 84° 52.875', 27 Sep 2001, *R. Lance 2194* (UWO); SE of Coleman, W side of Co. Rd 20 (Cemetery Road), ca. 6 mi from its S end and 1.8 mi from its jct. with Hwy 160, across from pine plantation and "posted" sign, N 31° 39.375', W84° 54.853', 27 Sep 2001. *R. Lance 2182* (UWO); SE of Coleman, 6.2 mi from S end of Rd. 20 and 1.6 mi from jct. with Hwy 160, N 31° 39.468', W 84° 54.642', 27 Sep 2001, *R. Lance 2183* (UWO).

LOUSIANA. Rapides Parish: Lacompte Quad., 09 Jul 1977, *L.E. Urbatsch 3237* (LSU). **St. Tammany Parish:** 4 mi W of Bush, N of La 40, pinewoods, 26 Sep 1975, *R. D. Thomas & C. Allen 47164* (NLU). **Washington Parish:** Bogalusa, 03 Oct 1919, *R.S. Cocks 3151* (NO); woods at Mt. Hermon Cemetery beside La. 450 NW of Mt. Hermon, Sec. 40, T1S, R9E, 14 Jun 1983, *R.D. Thomas 84147* (UWO).

MISSISSIPPI. Covington Co.: 2.5 mi NE of Collins, pine hardwoods, 08 Apr 1961, *L.H. Shinners 29359* (GA). **George Co.:** Pascagoula river S of MS 26, 2 mi E. of Benndale, 31° 07'N, 88° 48'W, 28 Mar 1975, *R.D. Thomas, C.M. Allen & G. Landry 42999* (LSU). **Greene Co.:** roadside in wooded country near McLain on US 98, 31° 07'N, 88° 48'W, 07 Apr 1984, *J.B. Phipps & T.C. Wells 5338* (UWO); roadside in wooded country near McLain on US 98, 07 Apr 1984, *J.B. Phipps & T.C. Wells 5336* (UWO). **Kemper Co.:** 2 mi E. of De Kalb, 12 Aug 1961, *S. McDaniel 2669* (IBE). **Lauderdale Co.:** Meridian; 12 Apr 1900, *C.S. Sargent s.n.* (DOV); 3 mi S of Meridian, 19 Jul 1956, *J.D. Ray, Jr. 7087*; (USF). **Noxubee Co.:** Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, 32° 57'N, 88° 45'W, 27 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8101* (UWO); turn N from Hwy 21 at Gholson onto gravel road beside Church of God of Prophecy, collections along road, 1.5 mi N of Hwy 21, T13NR15E S26, 27 Apr 1984, *T.E. Smith 273* (UWO). **Perry Co.:** damp wooded roadsides on US 98 near New Augusta, 31° 13'N, 89° 00'W, 07 Apr 1984, *J.B. Phipps & T.C. Wells 5342* (UWO). **Simpson Co.:** Saratoga, 01 Apr 1903, *S.M. Tracy 8490* (MSC); SE of Lemon on 35, SR 533A, 32° 07'N, 89° 29'W, 26 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8088* (UWO). **Winston Co.:** ca. 8.0 mi SE of

Louisville on sides of NW-SE gravel rd. ca. 1 mi SE of int. with N-S FAS blacktop, T14N R14E S33 SW4, 08 May 1985, *T.E. Smith 1291* (UWO); ca. 2.5 mi ENE of Handle, side of NE-SW gravel rd. ca. 0.1 mi NE of jct. with NW-SE gravel rd., T13N R14E S14 SE4, 24 Jun 1985, *T.E. Smith 1403* (UWO).

SOUTH CAROLINA. Newberry Co.: 21 Apr 1971, *L.H. Buff, Jr. 203* (USCH).

TEXAS. Jasper Co.: Rich wooded slopes, road to Magnolia Springs, 8 mi S of Jasper, 11 May 1945, *R. McVaugh 6833* (BRIT). **Newton Co.:** Saw Mill Road, N side, 30° 52'N, 93° 50'W, 18 Oct 1988, *J.B. Phipps 6273* (UWO); wooded hills, old pine-oak stand, 4 mi W of Newton, 13 May 1945, *R. McVaugh 6855* (BRIT); wooded hills, old pine-oak stand, 4 mi W of Newton, 13 May 1945, *R. McVaugh 6857* (BRIT).

Crataegus opima Beadle

ALABAMA. Autauga Co.: Hwy 45, 6 mi E of Prattsville, 21 Apr 1962, *T. Denton 81* (ALA). **Butler Co.:** near Greensville, 16 Apr 1931, *E.J. Palmer 38688* (MO). **Cherokee Co.:** Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8043* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8047* (UWO); Little River Canyon Mouth Park, entrance Road, 34° 17'N, 85° 40.5'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8056* (UWO); entrance to Little River Canyon Mouth Park, 34° 17'N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7930* (UWO); Little River Canyon rim road ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7937* (UWO); entrance road to Little River Canyon Mouth Park, 34° 17'N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7926* (UWO); Little River Canyon one third way up access road to top, beyond Canyon Mouth Park, 34° 17'N, 85° 41'W, 08 Oct 1998, *J.B. Phipps 7841* (UWO); Little River Canyon one third way up access road to top, beyond Canyon Mouth Park, 34° 17'N, 85° 41'W, 08 Oct 1998, *J.B. Phipps 7840* (UWO). **Geneva Co.:** Bluff on E side of Hwy 45 at crossing of Chectawhatchee River, near Bellwood, 23 Sep 1999, *R. Lance s.n.* (UWO). **Conecuh Co.:** US 31 at Travis Bridge, Sepula R., 17 Aug 1985, *A.R. Diamond 1517* (AUA). **Dallas Co.:** 2 mi NW Shephardsville, SE bank Alabama R., 08 Sep 1982, *S.C. Gunn 1231* (AUA); Elm Bluff, W of Shephardville on Alabama River, 32° 11'N, 87° 05'W, 02 Oct 1998, *J.B. Phipps & R. Lance 7791* (UWO); road to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville, 32° 11'N, 87° 05'W, 24 Sep 1999, *R.J. O'Kennon & R. Lance 14456* (UWO); road to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville, 32° 11'N, 87° 05'W, 24 Sep 1999 *R.J. O'Kennon & R. Lance 14457* (UWO); road to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville, 32° 11'N, 87° 05'W, 24 Sep 1999, *R.J. O'Kennon & R. Lance 14459* (UWO); road to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville, 32° 11'N, 87° 05'W, 24 Sep 1999, *R.J. O'Kennon & R. Lance 14461* (UWO); road to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville, 32° 11'N, 87° 05'W, 24 Sep 1999, *R.J. O'Kennon & R. Lance 14460* (UWO); Elm Bluff, W of Shephardville on Alabama River, 32° 11'N, 87° 05'W, 02 Oct 1998, *J.B. Phipps & R. Lance 7792* (UWO); Elm Bluff, W of Shephardville on Alabama River, 32° 11'N, 87° 05'W, 02 Oct 1998, *J.B. Phipps & R. Lance 7793* (UWO); Dallas Co. Rd. 407 between Shephardville and Elm Bluff near parking area on right, along N-W trending track at 1 km, 32° 11'N, 87° 05'W, 14 Apr 1999, *J.B. Phipps 7903* (UWO). **Monroe Co.:** near Frisco City; 01 Jun 1940, *J. Kelly 22* (GA). **Tallapoosa Co.:** Route 50 ca. 1 km E of Martin Dam, 32° 41'N, 85° 53'W, 16 Oct 1984, *J.B. Phipps* 5497a (UWO). **Tuscaloosa Co.:** Tuscaloosa, 11 May 1890, *C. Mohr s.n.* (ALU); Romulus Rd. (Co. Rd. 51) at 3.3 km short of Gainesville Rd, 33° 08'N, 86° 44'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8057* (UWO); Romulus Rd. (Co. Rd. 51) at 3.3 km short of Gainesville Rd., 33° 08'N, 86° 44'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8058* (UWO); Co. Rd. 2, 10 km NE of jct. 10 or 51, SE side of, at gate with big overview opposite, 33° 13'N, 87° 42'W, 13 Apr 1999, *J.B. Phipps 7890* (UWO); Co. Rd. 2, ca. 3 mi S of Coker, E side of road on outside of curve, 33° 13.5'N, 87° 46'W, 13 Apr 1999, *J.B. Phipps 7893* (UWO); Co. Rd. 2, 3 km NE of jct. 10 or 51, SE side of road just before private house, 33° 10'N, 87° 43'W, 13 Apr 1999, *J.B. Phipps 7885* (UWO); Kellytown Rd., 1 km from jct. Valley Rd., 33° 07'N, 87° 49'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8075* (UWO). **Sumter Co.:** ca. 9 mi SSE of York, by Ala 17, 05 Jun 1971, *R. Kral 42979* (VDB).

FLORIDA. Gadsden Co.: Off Dolan Rd. to N, WSW of River Jct., 30 Apr 1983, *R.K. Godfrey 80540* (UWO).

GEORGIA. De Kalb Co.: Decatur, 10 Aug 1901, *R.M. Harper 1184* (MO). **Early Co.:** Kolomoki Mounds State Park, oak woods just W of museum, 31° 28'N, 84° 55'W, 03 Oct 2000, *J.B. Phipps & R. Lance 8196* (UWO); Kolomoki Mounds State Park, oak woods just W of museum, 31° 28'N, 84° 55'W, 03 Oct 2000, *J.B. Phipps & R. Lance 8195* (UWO). **Grady Co.:** Susina Plantation, 11 Apr 1966, *R. White 203* (IBE). **Randolph Co.:** SE of Coleman, 6.7 mi from S end of Co. Rd. 20 and 1.1 mi from jct. with Hwy 160, ca. 20 ft. W of road, in young oak woodland just W of cemetery and telephone cable post "616-12," N31° 39.708', W 84° 54.131', 27 Sep 2001, *R. Lance 2185* (UWO); Co. Rd. 160, just S of Coleman, 31° 39.5'N, 84° 53'W, 03 Oct 2000, *J.B. Phipps & R. Lance 8198* (UWO); SE of Coleman, ca. 0.5 mi W of Co. Rd 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 27 Sep 2001, *R. Lance 2188* (UWO); SE of Coleman, ca. 0.5 mi W of Co. Rd 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 09 Apr 2001, *R. Lance 2109* (UWO).

LOUISIANA. Washington Parish: Thigpel Cr., N of LA 16 and E of Enon, 09 Apr 1978, *R.D. Thomas, D. Moreland & P. Pias 57458* (NLU).

MISSISSIPPI. Clarke Co.: Clarko State Park, wooded slope near exit drive on US Hwy 45, 09 1999, *R. Lance s.n.* (UWO); Clarke County State Park, N exit on US 45, 32° 42'N, 88° 07'W, 12 Apr 1998, *J.B. Phipps 7698;* (UWO). **Lauderdale Co.:** Meridian, 27 Apr 1901, *T.G. Harbison H4200* (US). **Noxubee Co.:** Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, just after first side road left, 32° 57'N, 88° 45'W, 16 Apr 1999, *J.B. Phipps 7915* (UWO); Butler Rd. running N from MS 21 ca. 1 mi W of Gholson, E side of road, 32° 57'N, 88° 45'W, 27 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8102* (UWO); Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, E side of road, 32° 57'N, 88° 45'W, 27 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8096* (UWO); Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, E side of road, 32° 57'N, 88° 45'W, 27 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8099* (UWO); Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, E side of road, 32° 57'N, 88° 45'W, 27 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8098* (UWO); Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, just after first side road left, at right, 32° 57'N, 88° 45'W, 16 Apr 1999, *J.B. Phipps 7916* (UWO). **Perry Co.:** ca. 11 mi NE of Wiggins, NW of jct. of forest road 318B-1 and Black Creek Trail, along Black Creek Trail, "Red Hills", T1S, R10W, section 28 and 21, 30 Apr 19??, *R.F.C. Naczi et al 5119* (VDB). **Smith Co.:** SE of Lemon on 35, SR 533A, 32° 07'N, 89° 29'W, 26 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8089* (UWO). **Winston Co.:** ca. 12 mi ESE of Louisville N side of SE-SW gravel rd. ca. 1 mi NW of Hwy 490 int., T14N R14E S23 SE4, 08 May 1985, *T.E. Smith 1289* (UWO).

TEXAS. Jasper Co.: S of Jasper, 15 Apr 1942, *C.L. & A.A. Lundell 11191* (SMU); S of Jasper off highway 96 between road to Magnolia Springs and road to Roganville, E side of road, 14 Apr 1963, *D.S. and H.B. Correll 27231* (LL); Road to Magnolia Springs, 8 mi S of Jasper, 11 May 1945, *R. McVaugh 6833* (SMU); S of Jasper; 09 Sep 1942, *C.L. Lundell & S.W. Geiser 111819* (SMU). **Newton Co.:** Newton, 04 Jul 1960, *J. Knapp s.n.* (NATC); Saw Mill Road ca. 1.5 km W of Saw Mill Town, 30° 52'N, 93° 50'W, 12 Apr 1988, *J.B. Phipps & L. Lowrie 6079* (UWO); Saw Mill Road ca. 1.5 km W of Saw Mill Town, 30° 52'N, 93° 50'W, 12 Apr 1988, *J.B. Phipps & L. Lowrie 6077* (UWO); Saw Mill Road, N side, 30° 52'N 93° 50'W; 18 Oct 1988, *J.B. Phipps 6274* (UWO); Saw Mill Road, N side, 30° 52'N, 93° 50'W; 18 Oct 1988, *J.B. Phipps 6275* (UWO); Saw Mill Rd. ca. 0.75 km W of Saw Mill Town, 30° 52'N, 93° 49'W, early Nov 1987, *L. Lowrie s.n.* (UWO); intersection of two dirt roads S of US 190, the one joining US 190 3 mi W of Newton, 30° 52'N, 93° 51'W, 12 Apr 1988, *J.B. Phipps & L. Lowrie 6076* (UWO); Saw Mill Road, N side, 30° 52'N, 93° 50'W, 18 Oct 1988, *J.B. Phipps 6272* (UWO); Saw Mill Road, N side, 30° 52'N, 93° 50'W, 18 Oct 1988, *J.B. Phipps 6276* (UWO); 4 mi W of Newton, 13 May 1945, *R. McVaugh 6856* (SMU).

Crataegus cf. **opima** Beadle
ALABAMA. Cherokee Co.: Entrance road to Little River Canyon Mouth Park, 34° 17'N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7945* (UWO); entrance road to Little River Canyon Mouth Park, 34° 17'N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7927* (UWO); Little River Canyon, S rim above Canyon Mountain Park, between mi 2 and 3 at county road bordering canyon rim, 07 Apr 1998, *R. Lance s.n.* (UWO). **Dallas Co.:** r oad to Elm Bluff from Shephardville, ca. 1.5 km W of Shephardville along trail to deer pit (N of road), 32° 11'N, 87° 05'W, 24 Sep 1999, *R.J. O'Kennon & R. Lance 14463* (UWO); N of Trussville on road to Clay, 1.9 km. after bridge over Highway I-59. RHS before 45 mph sign, 33° 40'N, 86° 36'W, 25 Apr 1983, *P.F. Ulf-Hansen PF029* (UWO). **Tuscaloosa Co.:** Co. Rd. 2, 5 km NE of jct. 10 or 51, 33° 12'N, 87° 43'W, 13 Apr 1999, *J.B. Phipps 7887* (UWO); probably Co. Rd. 19 (but maybe Co. Rd. 51), 4 km SE of jct. 2, 33° 07'N, 87° 44'W, 13 Apr 1999, *J.B. Phipps 7883* (UWO); Co. Rd. 2 at 11 km NE of jct. 51 at overlook, 33° 13'N, 87° 42'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8069* (UWO).

MISSISSIPPI. Noxubee Co.: Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, E side of road, 32° 57'N, 88° 45'W, 28 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8103* (UWO).

Crataegus pallens Beadle (placed with *C. venusta* in text)
ALABAMA. Cherokee Co.: Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7943* (UWO). **Dallas Co.:** Dallas Co. Rd. 407 between Shephardville and Elm Bluff near parking area on right, along NW trending track at 1 km, 32° 11'N, 87° 05'W, 14 Apr 1999, *J.B. Phipps 7902* (UWO). **Tuscaloosa Co.:** banks of Warrior R., 1895, *C. Mohr s.n.* (ALA).

NORTH CAROLINA. Buncombe Co.: Biltmore, 18 Sep 1902, *Biltmore Herb. s.n.* (DOV).

Crataegus pinetorum Beadle
ALABAMA. De Kalb Co.: De Soto State Park, 25 Sep 2001, *R. Lance 2174* (UWO). **Jefferson Co.:** near Birmingham, 20 Apr 1900, *C.S. Sargent s.n.* (DOV).

GEORGIA. Floyd Co.: Horseleg Mtn., 07 Oct 1982, *J.B. Phipps 5169* (UWO). **Jackson Co.:** Tallahassee Shoals, 30 Apr 1930, *J.M. Reade E8293* (GA).

MISSISSIPPI. Smith Co.: SE of Lemon, 30 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8092* (UWO); SE of Lemon, 12 Apr 2000, *J.B. Phipps 8122, 8123* (UWO).

Crataegus pulcherrima Ashe
ALABAMA. Butler Co.: Oaky Streak, approx. 1.5 mi W of Co. 59, 04 Apr 1985, *A.R. Diamond 276* (AUA). **Cherokee Co.:**

Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N 85° 42'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8044* (UWO). **Choctaw Co.:** 9 mi N of Toxey, just N firetower, Tallahatta formation, 03 May 1968, *S. McDaniel 10600* (FSU, IBE). **Pike Co.:** Sandy 'Big Pocosin', SE Troy and NE Fairgrounds, 10 Sep 1968, *R. Kral 33159* (MO).

FLORIDA. Gadsden Co.: Quincy, in woods, 04 Sep 1895, *G.V. Nash 2568* (DOV, MSC); River Jct., 10-11 Aug 1895, *G.V. Nash 2377* (DOV); W of property belonging to River Jct. Hunt Club, beyond end of road on right fork off Dolan Road, W, SW of River Jct., 22 May 1982, *R.K. Godfrey 79819* (UWO); SW of railroad/Mosquito Creek, WSW of River Jct., 22 May 1982, *R.K. Godfrey 79815* (UWO). **Holmes Co.:** Route 185, ca. 1.25 km SW of Co. Rd. 181 just (ca. 150 m) NE of brow on SE Side of road, 30° 52'N, 86° 02'W, 14 Aug 1993, *J.B. Phipps 6741* (UWO). **Jackson Co.:** 9 mi NW of Marianna, 21 Oct 1955, *R.K. Godfrey & H. Kurz 54277* (DUKE). **Leon Co.:** Tallahassee, ca. 2 mi S of town, 10 Apr 1966, *R.A. Norris 705* (IBE); woods near Lake Jackson, 07 Apr 1934, *L. Griscom 21519* (GH). **Liberty Co.:** near Bristol, 06 Sep 1940, *W.A. Murrill* s.n. (GA); near picnic area, Torreya State Park, 16 Jul 1983, *R.K. Godfrey 80782* (UWO). **Wakulla Co.:** near Wakulla Springs, 10 Jun 1958, *R.K. Godfrey 57030* (DUKE).

GEORGIA. Randolph Co.: Co. Rd. 62, 1 3/8 mi from jct. 160, top of bank on LHS, 31° 38'N, 84° 54'W, 03 Oct 2000, *J.B. Phipps & R. Lance 8202* (UWO); Co. Rd. 62, 1 1/8 mi from jct. 160 top of road bank on RHS, 31°38.5'N, 84° 53.5'W, 03 Oct 2000, *J.B. Phipps & R. Lance 8201* (UWO); Co. Rd. 62, 7/8 mi from jct. 160 top of road bank on RHS, 31° 38'N, 84° 53'W, 03 Oct 2000, *J.B. Phipps & R. Lance 8200* (UWO); SE of Coleman, 6.2 mi from S end of Rd. 20 and 1.6 mi from jct. with Hwy 160, on E side of road, N 31° 39.468', W 84° 54.642', 27 Sep 2001, *R. Lance 2184* (UWO); SE of Coleman, ca. 0.5 mi W of Co. Rd. 160, on N side of Co. Rd. 62, across from old drive, N31° 28.630', W 84° 52.875', 27 Sep 2001, *R. Lance 2189* (UWO). **Worth Co.:** Flint River, 1.9 mi W of Warwick, 17 Aug 1966, *W.R. Faircloth 3901* (GA).

LOUISIANA. Washington Parish: Bogalusa, 05 Apr 1919, *R.S. Cocks 3149* (NO).

MISSISSIPPI. George Co.: W bank of Pascagoula R. 7 mi E of Bendale, 28 Mar 1975, *R.D. Thomas, C.M. Allen & G. Landry 42999* (NLU). **Lauderdale Co.:** Mt. Barton and vicinity of S of Meridian, 11 Jun 1957, *G.R. Cooley 5274* (USF). **Smith Co.:** SE of Lemon on 35. SR 533A, 32° 07'N, 89° 29'W, 26 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8091* (UWO); ESE of Lemon on 533A, right hand side of road at 1.1 km W of jct. 533, 32° 07'N, 89° 26'W, 26 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8095* (UWO); SE of Lemon on 35, SR 355A, 32° 07'N, 89° 28'W, 26 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8093* (UWO).

Crataegus sargentii Beadle

ALABAMA. Cherokee Co.: Little River Canyon Mouth Park, entrance road, 34° 17'N, 85° 40.5'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8052* (UWO); Little River Canyon, road from canyon mouth to Daniel's Gap, middle third, 34° 17'N, 85° 41'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7932* (UWO); Little River Canyon rimroad ca. 1 km direct NW from Daniel's Gap, 34° 18'N, 85° 42'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8041* (UWO). **Clarke Co.:** Co. Rd. 15, S of Jackson, 31° 26'N, 87° 52'W, 01 Oct 2000, *J.B. Phipps & R. Lance 8194* (UWO). **Dale Co.:** 3 mi N of Clayhatchee, by AL 85, 09 Jun 1971, *R. Kral 43182* (AUA). **Dallas Co.:** ca. 5 mi E of Sardis on Co. Rd. 30, 32° 15'N, 86° 48'W, 06 Apr 1984, *J.B. Phipps & T.C. Wells 5321* (UWO). **De Kalb Co.:** De Soto State Park, to rear of campsite #27, 34° 30.019'N, 85° 37.579'W, 25 Sep 2001, *R. Lance 2171* (UWO); De Soto State Park, near campground, 34° 30'N, 85° 38'W, 08 Oct 1998, *J.B. Phipps 7846* (UWO); Lookout Mountain, De Soto State Park, SE side of campground, near site # 59, 16 Sep 1994, *R. Lance 9405* (UWO); Lookout Mountain, De Soto State Park, NW side of campground, near site #21, 16 Sep 1994, *R. Lance 9402* (UWO); De Soto State Park, campground area, 34° 30"N, 85° 38'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8035* (UWO); scrubby woodland on conglomerate ca. 5 km NW of Little R. on route 35, 34° 24'N, 85° 39'W; 08 Oct 1982, *J.B. Phipps 5190* (UWO), De Soto State Park, woodland adjacent to campground, 34° 30.019'N, 85° 37.579'W, 25 Sep 2001, *R. Lance 2169* (UWO); De Soto State Park, campground area, 34° 30'N, 85° 38'W, 19 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7953* (UWO); Lookout Mountain, back roads S of Mentone on route 117, 34° 33"N, 85° 35'W, 08 Oct 1982, *J.B. Phipps 5196* (UWO). **Marshall Co.:** Lake Guntersville State Park, Cutchenmire Trail, 34° 22'N, 86° 11'W, 21 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8029* (UWO). **St. Clair Co.:** near Springville on U.S. 11, 3.5 km from jct. with Old Springville Rd. RHS going N, 50 m. from field edge, along fenceline, 33° 46'N, 86° 29'W, 26 Apr 1983, *P.F. Ulf-Hansen PF037* (UWO). **Tuscaloosa Co.:** Lock 13, 23 May 1952, *R.L. and O.D. Chermock s.n.* (ALA); Kellytown Rd, 1 km from jct. Valley Rd., 33° 07'N, 87° 49W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8074* (UWO); Co. Rd. 2, 5 km NE of jct. 10 or 51, 33° 12'N, 87° 43'W, 13 Apr 1999, *J.B. Phipps 7888* (UWO); Co. Rd. 2 at 11 km NE of jct. 51 at overlook, 33° 13'N, 87° 42'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8067* (UWO); Romulus Rd. (Co. Rd. 51) at 3.3 km short of Gainesville Rd, 33° 08'N, 86° 44'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8064* (UWO).

FLORIDA. Holmes Co.: Rte. 185, 1.9 km SW of Co. Rd 181, NW side of road, backing onto woodland, 30° 53'N, 86° 05'W, Apr 1991, *J.B. Phipps 6477* (UWO). **Leon Co.:** Border of second-growth upland woodland, by Hartsfield Road, N side, perhaps the equivalent of a city block off capital circle, Tallahassee, 06 Apr 1983, *R.K. Godfrey 80414* (UWO).

GEORGIA. Burke Co.: Rte. 56, N of intersection with 80, just N of Lake Crystal Rd. to E, 33° 05'N, 82° 03'W, 09

Apr 1991, *J.B. Phipps 6500*; (UWO). **Floyd Co.:** Horseleg Mtn., 34° 14'N, 85° 13'W, 07 Oct 1982, *J.B. Phipps 5171* (UWO). McGee Bend Rd. off Ga. 100 (WSW of Rome), 34° 10.5'N, 85° 22.5'W, 04 Apr 2000, *J.B. Phipps 8211* (UWO). Horseleg Mtn., near roadside, S-side, 34° 14'N, 85° 13'W, 07 Oct 1982, *J.B. Phipps 5173* (UWO). McGee Bend Rd. off GA 100 (WSW of Rome), 34° 10.5'N, 85° 22.5'W, 04 Oct 2000, *J.B. Phipps 8210* (UWO). **Grady Co.:** Upland second growth woodland, 3 mi NW of Beachton, by Ga. Rt. 93, 31 Mar 1982, *R.K. Godfrey 79490* (UWO).

MISSISSIPPI. Jasper Co.: 6 mi N of Montrose, 14 Apr 1962, *S. McDaniel 2943* (IBE). **Noxubee Co.:** Butler Rd., running N from MS 21, ca. 1 mi W of Gholson, before first side road left, 32° 57"N, 88° 45'W, 16 Apr 1999, *J.B. Phipps 7914* (UWO). **Smith Co.:** SE of Lemon on SR 35 to SR 533 at 0.8 km W of bridge, 32° 07'N, 89° 27'W; 26 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8094* (UWO).

Crataegus tecta Beadle

ALABAMA. Cherokee Co.: Little River Canyon road, ascent from canyon mouth to Daniel's Gap, ca. halfway up, 34° 17'N, 85° 41'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8051* (UWO). Little River Canyon, road from canyon mouth to Daniel's Gap, third of way up, 34° 17'N, 85° 41'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7931* (UWO). Little River Canyon rimroad, ca. 0.6 km N of Daniel's Gap, at overlook, 34° 18'N, 85° 41.5'W, 19 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7948* (UWO); Little River Canyon rimroad, ca. 1 mi NW of Daniel's Gap, 34° 17'N, 85° 41'W, 08 Oct 1998, *J.B. Phipps 7844a* (UWO). **Dallas Co.:** Elm Bluff, W of Shephardville on Alabama River, wooded slope on N side of access road ca. 2 mi back, 32° 11'N, 87° 05'W, 02 Oct 1998, *J.B. Phipps & R. Lance 7789* (UWO). **Geneva Co.:** Bluff on W side of Hwy 167, near High Bluff and just S of crossing of Chectawhatchee River, 23 Sep 1999, *R. Lance s.n.* (UWO). **Houston Co.:** Philadelphia, 22 Jun 1984, *R.D. Whetstone 14183* (UWO). **Montgomery Co.:** US 80 at Caney Creek, thickets at N side of highway, 32° 19'N, 86° 23'W, 24 Sep 1999, *R.J. O'Kennon & R. Lance 14451* (UWO). **Sumter Co.:** 3 mi SW York, 07 Jun 1963, *S.B. Jones, Jr. 1319* (GA). Old Bluffport, off S.R. 28 ca. 7 mi due E of Livingston, along wooded tracks ca. 3/4 mi back from Tombigbee R, 32° 42'N, 88° 07'W, 11 Apr 1998, *J.B. Phipps 7695* (UWO). **Tuscaloosa Co.:** 4.9 mi S of Shirley Bridge (Sipsey) on Co. Rd. 21, 07 Apr 1977, *J.H. Wiersema 48* (ALU). 4.9 mi E of Shirley Bridge on Co. Rd. 21, 07 Apr 1970, *J.A. Daniels 22* (ALU); Co. Rd. 2 at 11 km NE of jct. 51 at overlook, 33° 13'N 87° 42'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8066* (UWO); Jct. Kellytown Rd. and Valley Rd., 33° 08'N, 87° 48'W, 23 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8072* (UWO).

FLORIDA. Gadsden Co.: Turkey Flight Park, Chattahoochee, near parking area, 21 Sep 1999, *R. Lance s.n.* (UWO). **Jackson Co.:** Three Rivers Recr. Area, 01 Apr 1982, *D.S. & H.B. Correll 53541* (USF). **Leon Co.:** 4 mi E of Tallahassee, deciduous woods, 16 Mar 1955, *R. K. Godfrey 53022* (USF); 2 mi N of Tallahassee, 31 Mar 1958, *R.K. Godfrey 56323* (NCSC).

GEORGIA. Bartow Co.: US 41 at Pumpkinvine Cr., small flood-plain, 34° 05'N, 87° 44.5'W, 19 Apr 2000, *J.B. Phipps et al. 8167* (UWO). **Clarke Co.:** 0.5 mi S of Athens, 26 Apr 1940, *W.H. Duncan 2073* (GA). **Decatur Co.:** Borders of woodland, between swimming area and Chattahoochee Park, U.S. Corps of Engineers property, close to Lake Seminole, ca. 3 mi N of Chattahoochee, Fla., 28 May 1983, *R.K. Godfrey and A. Gholson 80660* (UWO). **Early Co.:** Kolomoki Mounds St. Park woods behind museum, 20 Sep 1999, *R. Lance s.n.* (UWO); Kolomoki Mounds St. Park woods behind museum, 20 Sep 1999, *R. Lance s.n.* (UWO). **Floyd Co.:** McGee Bend Rd., off Ga. 100 (WSW of Rome), 34° 10.5'N, 85° 22.5'W, 19 Apr 2000, *J.B. Phipps et al. 8159* (UWO). **Randolph Co.:** SE of Coleman, ca. 0.5 mi W of Co. Rd 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 27 Sep 2001, *R. Lance 2191* (UWO); SE of Coleman, ca. 0.5 mi W of Co. Rd 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 27 Sep 2001, *R. Lance 2190* (UWO); SE of Coleman, ca. 0.5 mi W of jct. with Hwy 160, on S side of road, at woods and field corner, near phone box "616-6," N 31° 39.898', W 84° 53.642', 27 Sep 2001, *R. Lance 2186* (UWO); SE of Coleman, ca. 1.2 mi W of Co. Rd 160, on E side of Co. Rd. 62, on bank above road, after creek crossing, near pasture on hill, 27 Sep 2001, *R. Lance 2113* (UWO); SE of Coleman, ca. 0.5 mi W of Co. Rd 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 09 Apr 2001, *R. Lance 2110* (UWO); SE of Coleman, ca. 0.1 mi E of Co. Rd 20, on hilltop road into young pine plantation, N 31° 38.795', W 84° 55.069', 27 Sep 2001, *R. Lance 2181* (UWO).

MISSISSIPPI. Lauderdale Co.: Meridian, 15 Apr 1902, *T.G. Harbison s.n.* (NCU).

Marion Co.: Pearl River at White Bluff NW of Morgantown, 17 May 1967, *S.B. Jones 1236* (NCU). **Newton Co.:** ca. 2 mi S of Chunky, Chunky Sand Hill, 32° 18'N, 88° 55'W, 25 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8085* (UWO). **Noxubee Co.:** Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, E side of road, 32° 57'N, 88° 45'W, 27 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8097* (UWO). Butler Rd., running N from MS 21 ca. 1 mi W of Gholson, E side of road, 32° 57'N, 88° 45'W, 27 Sep 1999, *J.B. Phipps, R.J. O'Kennon & R. Lance 8100* (UWO), Butler Rd., running N from MS 21 abt 1 mi W of Gholson, just after first side road left, at right, bank, 32° 57'N, 88° 45'W, 16 Apr 1999, *J.B. Phipps 7917* (UWO). **Pearl River Co.:** Off route 43 ca. 12 km S of crossroads (at route 26), 30° 40'N, 89° 45'W, 08 Apr 1984, *J.B. Phipps & T.C. Wells 5346* (UWO).

NORTH CAROLINA. Buncombe Co.: Biltmore, 09 May 1902, *C.D. Beadle s.n.* (DOV).

TENNESSEE. Grundy Co.: NE of Tracy City on mine road from Hobbs Hill to coalmine, 35° 17'N, 85° 34'W, 01 Sep 1983, *P.F. Ulf-Hansen PF112* (UWO).

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ALABAMA. Bibb Co.: Co. Rd. 33, at Cahaba River, 14 Apr 1977, *A. Sessler 954* (AUA). **Butler Co.:** Greenville, - Aug 1898, *C. Mohr s.n.* (ALU). **Cherokee Co.:** Entrance Road to Little River Canyon Mouth Park, 34° 17"N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7929* (UWO); Little River Canyon rimroad just NE of Daniel's Gap, 34° 17'N, 85° 41.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7935* (UWO); Little River Canyon rimroad just N of Daniel's Gap, 34° 17'N, 85° 41.5'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8049* (UWO); Little River Canyon rimroad just NE of Daniel's Gap, 34° 1'N, 85° 41.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7934* (UWO); entrance Road to Little River Canyon Mouth Park, 34° 17'N, 88° 40.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7925* (UWO), Little River Canyon rimroad just NE of Daniel's Gap, 34° 17'N, 85° 41.5'W, 18 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7936* (UWO); Little River Canyon rimroad, across canyon of Falls Creek from '*Pulcherrimae* site', NW side of road on fairly straight stretch with broad shoulder right, 34° 18.5'N, 85° 41.5'W, 19 Apr 1999, *J.B. Phipps & R.J. O'Kennon 7949* (UWO); Little River Canyon road, ascent from canyon mouth to Daniel's Gap, ca. halfway up, 34° 17'N, 85° 41'W; 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8050* (UWO); Little River Canyon Mouth Park, entrance road, 34° 17'N, 88° 40.5'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8053* (UWO). **Dallas Co.:** Dallas Co. Rd. 407 between Shephardville and Elm Bluff near parking area on right, along N-W trending track at 1 km, 32° 11'N, 87° 05'W, 14 Apr 1999, *J.B. Phipps 7901* (UWO). **Marshall Co.:** Lake Guntersville State Park on Cutchenmire Trail near Berry Point, 34° 22'N, 86° 11'W, 21 Apr 1999, *J.B. Phipps, R.J. O'Kennon & D. Spalding 7966* (UWO); AL 219, 4 km S of jct. AL 83 in Talladega National Forest, hedgerow on E side opposite two minor roads, 37° 43'N, 87° 06.5'W, 13 Apr 1999, *J.B. Phipps 7882* (UWO). **Pickens Co.:** dirt road between Fellowship and New Hope churches, 2.2 mi N of Co. Rd. 30, 09 Apr 1977, *L.J. Davenport 22* (ALA). **St. Clair Co.:** ca. 9 mi N Pell City, 22 Apr 1968, *R. Kral 30389* (VDB). **Tallapoosa Co.:** Route 50 ca. 1 km E of Martin Dam, 32° 41'N, 85° 53'W, 16 Oct 1984, *J.B. Phipps 5501* (UWO). **Tuscaloosa Co.:** 4.9 mi S of Shirley Bridge and Co. Rd. 21, 07 Apr 1977, *J.H. Wiersema 48* (ALA); Co. Rd. 2, 10 km NE of jct. 10 or 51, SE side of, at gate with big overview opposite, 33° 13'N, 87° 42'W, 13 Apr 1999, *J.B. Phipps 7891* (UWO).

FLORIDA. Jefferson Co.: By U.S. Rt. 27, 1 mi SE of Jefferson-Leon Co. line and NW of Wacissa-Lloyd Crossroad, 27 Mar 1982, *R.K. Godfrey 79486* (UWO).

GEORGIA. Randolph Co.: SE of Coleman, ca. 0.5 mi W of Co. Rd. 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 27 Sep 2001, *R. Lance 2192* (UWO); SE of Coleman, ca. 0.5 mi W of Co. Rd. 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 09 Apr 2001, *R. Lance 2108* (UWO), SE of Coleman, ca. 0.1 mi E of Co. Rd. 20, on hilltop road into young pine plantation, N 31° 38.795', W 84° 55.069', 10 Apr 2001, *R. Lance 2115* (UWO); SE of Coleman, ca. 6.2 mi from S end of Rd. 20 and 1.6 mi from jct. with Hwy 160, N 31° 39.468', W 84° 54.642', 10 Apr 2001, *R. Lance 2118* (UWO).

LOUSIANA. Bienville Parish: Bear Creek Gas Field in T16N, R6W, Sec. 1 approx. 4 mi SE of Bryceland, 12 Apr 1975, *D. Moreland 576* (UWO).

MISSISSIPPI. Jasper Co.: 6 mi N of Montrose, 20 Aug 1961, *S. McDaniel 2683* (IBE). **Lauderdale Co.:** ca. 2.5 mi S of Meridian (T15N R16E S6 NE 4) off side of NW-SE gravel rd., 18 May 1985, *T.E. Smith et al. 1327* (UWO). **Kemper Co.:** Few mi along paved road W from MS 39 to Sciple's Mill turn-off, 32° 52'N, 88° 44'W, 16 Apr 1999, *J.B. Phipps 7913* (UWO). **Noxubee Co.:** MS 21, S side, 6.45 km W of jct. 39, 32° 58'N 88° 40'W, 16 Apr 1999, *J.B. Phipps 7918* (UWO).

TEXAS. Newton Co.: ca. 20 mi NW of Burkville on Little Cow Creek, 11 May 1956, *E. Whitehouse 31248* (SMU). **Jasper Co.:** 7.5 mi N of Jasper, 11 May 1945, *R. McVaugh 6828* (SMU).

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ALABAMA. Cherokee Co.: Little River Canyon Mouth Park, entrance road, 34° 17'N, 85° 40.5'W, 22 Sep 1999, *J.B. Phipps & R.J. O'Kennon 8054* (UWO). **Dallas Co.:** 9 km E of Sardis on Co. Rd. 30, 32° 15'N, 86° 48'W, 15 Oct 1984, *J.B. Phipps 5485* (UWO). **De Kalb Co.:** Little River Canyon rimroad, ca. 1 mi NW of Daniel's Gap, 34° 17'N, 85° 41'W, 08 Oct 1998, *J.B. Phipps 7844b* (UWO). **Sumter Co.:** Old Bluffport, off S.R. 28 ca. 7 mi due E of Livingston, along wooded tracks ca. 3/4 mi back from Tombigbee R., 32° 42'N, 88° 07'W, 11 Apr 1998, *J.B. Phipps 7697* (UWO). **Tuscaloosa Co.:** Tuscaloosa, 15 May 1874, *R.A. Smith s.n.* (ALU); along Co. Rd. 2, hilltop S of Romulus, wooded slope on E side, 10 Apr 1999, *R. Lance s.n.* (UWO).

FLORIDA. Gadsden Co.: Turkey Flight Park, Chattahoochee, 21 Sep 1999, *R. Lance s.n.* (UWO). **Leon Co.:** woods near L. Jackson, 04 Apr 1934, *L. Griscom 21519* (GH).

GEORGIA. Early Co.: Kolomoki Mounds State Park, ca. 0.25 mi NE of Tall Pines campground on ridge in mixed hardwood forest, 27 Sep 2001, *R. Lance 2178* (UWO). **Randolph Co.:** Co. Rd. 160, just S of Coleman, 31°

39.5'N, 84° 53'W, 03 Oct 2000, *J.B. Phipps & R. Lance 8197* (UWO); SE of Coleman, ca. 0.5 mi W of Co. Rd. 160, on N side of Co. Rd. 62, across from old drive, N 31° 28.630', W 84° 52.875', 27 Sep 2001, *R. Lance 2193* (UWO).

LOUISIANA. Washington Parish: woods beside Silver Creek and La. 438 N of Mt. Hermon, Sec. 41, T1S, R9E, 31 Oct 1980, *R.D. Thomas et al 74575* (UWO).

MISSISSIPPI. Greene Co.: roadside in wooded country near McLain on US 98, 31° 07'N, 88° 48'W, 07 Apr 1984, *J.B. Phipps & T.C. Wells 5334* (UWO).

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